

# Personal Software

## Software

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## What's New in OS/2 2.1

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This article highlights and gives details about the major differences between OS/2\* 2.0 and OS/2 2.1.

It has been over a year since IBM shipped OS/2 2.0. As a quick recap: OS/2 2.0 is a 32-bit operating system based on the Intel\*\* 80386 processor architecture. It provides Application Programming Interfaces (APIs) for DOS, Windows\*\*, OS/2 16-bit, and OS/2 32-bit programs. It also provides protection for each process that it executes, resulting in a high degree of integrity for running business-critical applications. OS/2 also provides a robust, stable platform for communications and local area network (LAN) extensions. All these features make OS/2 2.0 an excellent operating system for a 32-bit client workstation at a reasonable cost.

In OS/2 2.1, IBM has enhanced the platform with many new features, and has vastly improved overall function in these areas:

- DOS
- Windows
- Graphics engine
- Peripheral support
- Adobe Type Manager\*\* font outline engine



- Laptop support
- Printer support
- Base changes.

This article covers each of these areas.

### DOS Support

Overall, the DOS support in OS/2 2.1 has changed very little. DOS support in version 2.0 was excellent, and the Service Pak released last fall added a few minor enhancements. One in particular was the ability to provide a separate AUTOEXEC.BAT file for each session, including WIN-OS/2\* sessions. Another is the ability to service interrupts during I/O functions within a single VDM session.

This is particularly useful for multimedia extensions running under the WIN-OS/2 environment, and it enables OS/2 to provide support for Windows multimedia applications that is better than the support provided in the native DOS/Windows environment.

The other main enhancement – which pertains more to the 32-bit graphics engine than to DOS – is the graphics performance within a window. Before the Service Pak, when running a DOS graphic application (such as Flight Simulator) in a window, the screen update was very slow. This was attributed to the speed of the 16-bit/32-bit hybrid graphics engine. Now, in OS/2 2.1, the new 32-bit graphics engine and



the new 32-bit display device drivers bring stunning performance improvements in DOS graphic applications.

DOS support in OS/2 2.1 is still based on IBM PC-DOS 5.0, not 6.0. The major functions added in PC-DOS 6.0 are virus protection and memory extensions.

OS/2 provides memory management for each Virtual DOS Machine (VDM) that is outside the DOS environment. These memory extensions include support for the Expanded Memory Specification (EMS) with up to 32 MB per VDM session; for the Extended Memory Specification (XMS) with up to 16 MB per VDM session; and for DOS Protect Mode Interface (DPMI) with up to 512 MB per VDM session.

Virus protection in PC-DOS 6.0 is unique to DOS, and not useable in OS/2 2.1. However, a virus protection program native to OS/2 is shipped with computer systems that are preloaded with OS/2.

## Windows Support

The changes in Windows support in OS/2 2.1 are very significant. In OS/2 2.0, Windows support was based on Windows 3.0. In OS/2 2.1, IBM has removed all of the Windows 3.0 support and has replaced it with the newest version, Windows 3.1, which provides many performance and system integrity enhancements to version 3.0. Because Windows is based on DOS, there will still be limited available memory and system resources to run all of the applications. In OS/2 2.1, multiple Windows applications can run in multiple Windows sessions that offer crash protection and true multitasking of Windows applications. These major improvements

make OS/2 2.1 a better environment for Windows programs than native Windows 3.1 provides.

Another significant enhancement in Windows support in OS/2 2.1 is the ability to run Enhanced Mode applications. Windows Enhanced Mode can provide better performance than Standard Mode, and also provides additional APIs. Many applications require Windows Enhanced Mode to execute; for example, FrameMaker\*\*, OmniPage Professional\*\*, and Mathematica. OS/2 2.1 also permits users to run Standard Mode and Enhanced Mode sessions concurrently. This is a very significant enhancement to Windows support in OS/2.

One area of Windows support is not yet provided: the WIN32S API. The WIN32S API in Windows 3.1 is provided as a migration path to Windows NT\*\*. However, the WIN32S API does not exploit Windows NT when WIN32S applications run in the Windows NT environment. Also, WIN32S applications must be "thunked" when running in the Windows 3.1 environment, which degrades overall performance. In all, WIN32S does not provide a good API for migration.

WIN32S also relies on a special driver called a VxD. A VxD is similar to the Virtual Device Driver (VDD) in OS/2, but the main difference is that the VxD has code at Ring 0 of the 386/486 processor architecture.

IBM will continue to watch the evolution of the WIN32S API, and will support it if need arises.

Another enhancement to Windows support is that the Windows 3.1 applets are included in OS/2 2.1, to enable users to migrate more easily to

OS/2. The added applets include the base applets, Multimedia Extensions (MMEs), File Manager, and screen savers.

OS/2 2.1 installation allows full migration of the existing Windows 3.1 setup, including WIN-OS/2 groups, to folders in the Workplace Shell\*. The installation process also allows WIN-OS/2 support to be loaded onto a different drive than the boot drive.

In the area of fonts, Windows 3.1 provides TrueType\*\* outline font support as a native function. In OS/2 2.1, this TrueType support, as well as support for Adobe Type Manager\*\* (ATM), has been included in the WIN-OS/2 3.1 support. ATM support has been updated to version 2.5 for Windows. By supporting both TrueType and ATM outline font specifications, OS/2 2.1 is compatible with native Windows 3.1 and with native OS/2 Presentation Manager\* (PM) outline fonts that are based on ATM.

The overall performance of OS/2 2.1 has improved dramatically for both full-screen and seamless Windows sessions. Areas of improvement include loadtime for both full-screen and seamless environments, application loadtime, and file-I/O for the applications. Internal processing speed is also improved over OS/2 2.0. In general, the overall performance of OS/2 2.1 is equal to or better than that of native DOS 5.0 and Windows 3.1 on the same hardware (with 8 MB of system memory).

In OS/2 2.1, it is also possible to mix operational modes (Standard and Enhanced) with Windows applications. For example, one can run a full-screen Windows session and a Seamless session at the same time.



In addition, the mode, Standard or Enhanced, can be selected separately for each session.

This mixed-mode support can be extended further by providing both common-VDM and separate-session support concurrently for Seamless sessions. This support makes it possible to run multiple Windows applications in a single Windows session, which conserves computer resources. It also permits a very large Windows application to run in a separate, concurrent session. Overall, this kind of support for Windows applications is beyond the capabilities of native Windows 3.1, which provides only one session that runs in either Standard or Enhanced Mode. Also, Windows NT will only provide one Windows 3.1 environment, which makes NT no better than native Windows 3.1.

With all the major changes to Windows support in OS/2 2.1, OS/2 now supports Windows applications better than is possible with native Windows 3.1.

## Graphics Engine

The OS/2 2.0 Service Pak introduced the 32-bit Graphics Engine, which brought about overall performance and functional enhancements. This engine has been carried over to OS/2 2.1, along with additional drivers and better performance.

In the Service Pak, 32-bit display device drivers were provided only for VGA, SVGA with Tseng\*\* chip sets, and XGA\*. OS/2 2.1 comes with these drivers and many more, including drivers for Trident\*\*, Western Digital\*\*, ATI\*\*, Headland\*\*, Cirrus Logic\*\*, and IBM 8514/A display adapters. All these drivers are 32-bit, and they provide

<p><b>CD-ROM Drives</b></p> <p>CD Technology T3301  Hitachi CDR-1650, 1750, 3650, 3750  IBM CD-ROM I, II  NEC 25, 36, 37, 72, 73, 74, 82, 83, 84 and MultiSpin 38, 74, 84  Panasonic CR-501, LK-MC501S  Pioneer DRM-600, 604X  Sony CDU-541, 561, 6211, 7211, 6111  Texel DM-3021, 5021, 3024, 5024  Toshiba 3201, 3301, 3401</p> <p><b>SCSI Adapters</b></p> <p>Adaptec 1510, 1520, 1522, 1540, 1542, 1640, 1740, 1742, 1744  DPT PM2011, PM2012  Future Domain 845, 850, 850IBM, 860, 875, 885, 1650, 1660, 1670, 1680, MCS700, 7000EX  IBM PS/2 SCSI Adapter (cached and non-cached)  IBM 16-bit AT Fast SCSI Adapter</p> <p><b>Audio/Sound Adapters</b></p> <p>IBM Audio Capture Playback Adapter (ACPA)  Media Vision Pro Audio Spectrum 16 adapter  SoundBlaster series adapters</p>	
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**Figure 1. CD-ROM Drives, SCSI Adapters, and Audio/Sound Adapters Supported by OS/2 2.1**

seamless support for Windows. There are still a few missing drivers, however. The S3 chips, which provide graphic processor function similar to that of XGA, are becoming increasingly popular. OS/2 2.1 does not yet have drivers that exploit S3 chips. These drivers are being developed and tested as you read this, and should start rolling out within three months after OS/2 2.1 is generally available. The S3 drivers will include full support for 8-, 16- and 24-bit color modes.

With performance and functional improvements beyond the Service Pak, all Workplace Shell\* operations are faster. This is obvious on high-end systems with XGA, as well as on entry-level systems using 8-bit VGA. Stability of the shell itself is also improved by using 32-bit code.

## Peripheral Support

OS/2 2.1 answers the call for device drivers for industry-standard hardware such as printers, CD-ROMs, SCSI controllers, and audio/sound generation boards. OS/2 2.1 contains more than 260 printer device drivers for all leading printers. It supports all of the most popular CD-ROM drives and their associated SCSI adapters. The leading audio/sound adapters are also supported. Figure 1 lists the CD-ROM drives, SCSI adapters, and audio/sound adapters supported by OS/2 2.1.

## Multimedia Extensions

In its multimedia extensions, OS/2 provides support for both audio and video. Audio support includes device drivers for the adapters listed in Figure 1. The software audio features include record and playback



for the supported adapters at the maximum sample rates achievable. For example, for the ACPA card, sample rates can be up to 44.1 KHz with 16 bits of resolution and two concurrent (stereo) channels. There is also support for editing Wave files and playing MIDI files.

A new CD audio player allows easy control of the attached CD-ROM drive when used with standard audio CDs. The software control program allows tracking of audio playback; editing; storage of a unique title for each CD; and ejection of CDs via program control. Of particular interest is the ability to assign a title to a particular CD. This is accomplished by storing a title name in extended attributes that match to the index of a particular CD.

The video portion, named Ultimotion\*, provides full-motion video in software. No specific hardware is required. The Software Motion Video supports Audio-Video Interleave (AVI) and Intel's Indeo\*\* files for playback only. No record function is provided in the supplied extensions, but it is available separately.

Ultimotion supports up to 320 x 240 pixels of resolution with 256 colors per frame. The interleaved audio can have a resolution of either 8 or 16 bits. Frame rates as high as 30 frames per second are supported.

The overall quality of video animation is governed by the computer's processor speed and the performance of the display adapter. The audio portion of Ultimotion has priority over the video and will skip frames to maintain proper synchronization.

It is also necessary to have at least 8 MB of memory installed to use

the multimedia extensions along with a fairly fast machine. A 486-class machine is preferred.

Other features of the multimedia extensions include system sounds that can be linked to various functions of the OS/2 desktop, such as opening and closing windows, startup and shutdown, and scroll-bar actions. These sounds can be individually assigned with the supplied audio Wave clips. Finally, there is a file conversion utility for converting various multimedia data-file formats.

### Adobe Type Manager

In OS/2 2.0, there were two totally separate font files: one for OS/2 Presentation Manager, and one for Windows. This required additional disk space when outline fonts were loaded for both environments. For OS/2 PM, the fonts were loaded into the \OS2\DLL directory and, if a PostScript\*\* printer was being used, the fonts were also loaded into the printer driver directory. Windows ATM fonts were loaded into the \PSFONTS directory.

The reason for these separate font files was that OS/2 used .AFM and .PFB files, while Windows used .PFA and .PFM files. Now, all of this has changed. In OS/2 2.1, all outline fonts are loaded into the \PSFONTS directory. The font files used for OS/2 PM have been changed to .OFM and .PFB, and Windows fonts are now .PFB and .PFM files. This change brings about significant reduction in the disk space required to support ATM fonts in both OS/2 PM and Windows environments.

The PostScript printer driver has also been replaced by a new 32-bit driver. The new driver no longer requires that the downloaded fonts be

stored separately in the printer driver directory. The PostScript driver now uses the fonts stored in the \PSFONTS directory, which reduces the disk space requirements for outline fonts. The printer driver automatically downloads the fonts as they become needed (based on a table specific to the printer's resident fonts). If the printer does not have sufficient memory to hold all of the required downloaded fonts, the new 32-bit PostScript driver can also send the fonts as vector files imbedded in the printer data stream. Having more intelligence in the printer driver results in improved function and performance for PostScript printers.

### Laptop Support

OS/2 2.1 also includes integrated support for laptop computers that are capable of running OS/2. First, a large mouse pointer is provided for LCD displays. LCD displays have a slow refresh rate, typically 32 Hz, so a standard-size mouse pointer disappears temporarily when it is moved. This makes it quite difficult to follow the mouse pointer, and requires the user to stop moving the mouse until the pointer regains a screen image. By increasing the physical size of the mouse pointer, this trait is lessened considerably. Color laptops, which use newer Thin-Film Transistor (TFT) displays, do not have this problem and do not need the large mouse pointer.

Advanced Power Management (APM) is also provided for laptops that have the appropriate API for APM. APM enables OS/2 to improve battery life when running. Typically, APM dims the display during long periods of inactivity. It also powers down the hard disk and suspends the computer when battery life is no longer sufficient to main-



tain normal operation. Later, when a new battery is installed, the APM feature restarts the suspended system without loss of data (provided that no real-time processing was running in the background when the computer was suspended).

The final form of laptop support is for the Personal Computer Memory Card International Association (PCMCIA\*\*) specification. This covers devices that conform to an industry-standard connector which supports devices such as credit-card-sized memory and modems. PCMCIA support also includes "hot-pluggable" support, provided that the laptop computer fully implements that portion of the PCMCIA specification. As an example, this allows the user to remove a modem card and install a token-ring while the machine is running.

### Printer Support

OS/2 2.0 came with support for hundreds of industry-standard printers. In OS/2 2.1, more printers have been added to both OS/2 and Windows support. As mentioned above, over 260 printer drivers are shipped with OS/2 2.1. IBM commits to maintain this high level of support for existing printers, and to add new printers as they are announced by IBM and other computer manufacturers.

### Base Changes

Thus far, this article has discussed the bulk of improvements to OS/2 2.1 that the user sees. There are also many significant internal changes that improve system performance, reduce memory requirements, and provide an even higher level of stability, reliability, and integrity.

Among these changes are the system .INI files. In previous versions

of OS/2, the .INI files, which include OS2.INI and OS2SYS.INI, were always kept open and actively used by OS/2 during operation. Because of this, these files could never be copied or backed up during system use. The other main disadvantage was that if system power was lost during updating of the .INI files, they could become corrupted. Once this happened, the system configuration information for the desktop could be lost.

The changes made are not so much internal to the structure of the .INI files, rather in how OS/2 2.1 uses and maintains them. In OS/2 2.1, the files are opened during boot time as a copy in memory. At this point, the physical .INI files on disk are closed, and the system operates on the images in memory. This has two distinct advantages: (1) the system runs considerably faster due to decreased disk access, and (2) the .INI files remain intact and can be copied during system operation.

OS/2 2.1 also maintains the .INI files much better. In the past, the .INI files were used as a repository for many things. This increased the size of the .INI files, causing them to become fragmented on the boot disk, and degrading the system performance. OS/2 2.1 updates the .INI files periodically, when the images contained in memory change due to system configuration changes. This helps to reduce the loss of system changes in case of power loss. Also, the system will cleanse the .INI files during system shutdown to ensure that all configuration changes made during operation have been saved and that unnecessary entries are deleted.

Many new bitmaps are provided for use as backgrounds for the main

desktop or for folders. Also, the System Setup has been added to the main system pop-up. Another usability improvement enables the easy assignment of icons via simple drag-and-drop from any other system object.

Other changes in OS/2 2.1 include the International Standards Organization (ISO) fonts that originally appeared in the Service Pak for OS/2 2.0. Also, a CD-ROM documentation option is provided, allowing easy use of CD-ROMs for documentation, and relieving disk space requirements.

### Conclusion

The second release of the 32-bit OS/2 operating system provides new heights of performance, increased function, and stability. While disk space requirements have increased slightly (due to Windows 3.1 support, Windows applets, the 32-bit graphics engine, and associated 32-bit display device drivers), the overall performance has improved for computer systems that have 4 MB to 6 MB of memory.

For even better performance, use OS/2 on a computer system that has 6 MB to 8 MB of memory, a hard disk drive of 80 MB or larger, and a 386DX processor running at 20 MHz or faster. With this configuration, OS/2 2.1 promises to be the state-of-the-art operating system for today's powerful computer systems.

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## OS/2 2.1 Technical Update: Part 1

*This article is excerpted and adapted from the OS/2 2.1 Technical Update, one of a series of Red Books published by the IBM International Technical Support Center (ITSC) in Boca Raton, Florida. The IBM order number for this publication is GG24-3948.*

### Overview of OS/2 2.1

The aim of OS/2 2.1 is to run a wide range of applications, reliably and productively, on a wide range of PC hardware. OS/2 2.1 is based on OS/2 2.0, which provided an advanced 32-bit multitasking operating system for IBM and IBM-compatible PCs, and the capability to run DOS, Windows and OS/2 applications. Figure 1 shows an OS/2 2.1 screen in which DOS, Windows 3.1, and OS/2 applications are running concurrently.

OS/2 2.1 provides major enhancements in these three areas:

- Improved Application Support
  - Windows 3.1 applications (including multimedia), with WIN-OS/2 3.1
  - OS/2 multimedia applications, with Multimedia Presentation Manager/2\* (MMPM/2) 1.1
- Operating System Engine Upgrades
  - 32-bit Presentation Manager graphics engine

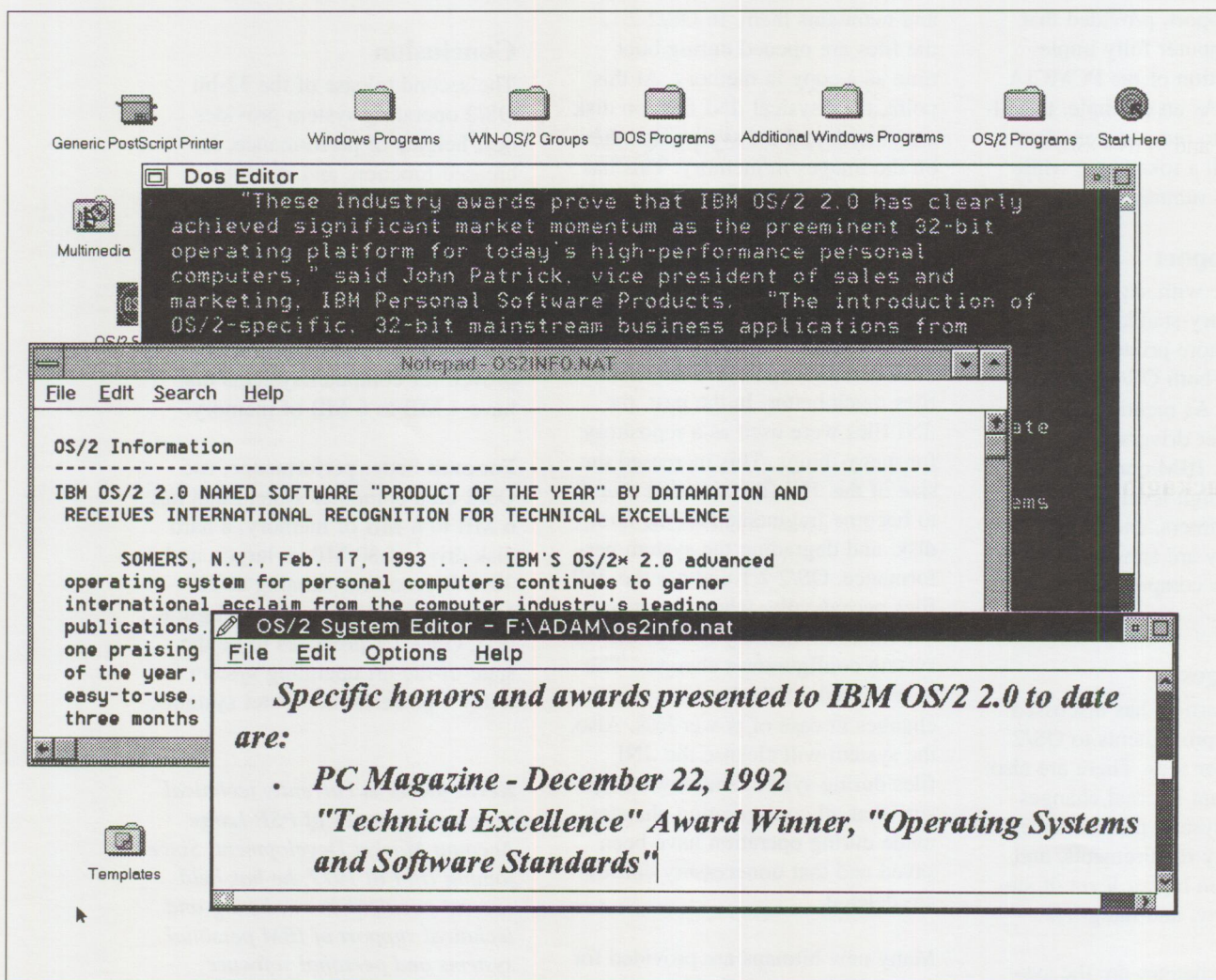


Figure 1. OS/2.1 Running DOS, Windows 3.1 and OS/2 Applications



- Performance enhancements, especially for the WIN-OS/2 environment
- Substantial code optimization and defect removal since the release of OS/2 2.0
- Wider Hardware Support
  - Installation of OS/2 2.1 from CD-ROM
  - OS/2 2.1 now preloaded by many PC manufacturers
  - Additional SCSI adapter and CD-ROM drive support
  - 32-bit seamless PM and WIN-OS/2 display drivers for XGA, XGA-2, 8514/A, VGA, and many SVGA adapters
  - Additional printer support for both PM and WIN-OS/2
  - APM and PCMCIA support for laptop and notebook computers

Some of these functions were introduced in OS/2 2.00.1 and in Service Pak XR06055 for OS/2 2.0. However, the majority of these features are new in OS/2 2.1.

### OS/2 2.1 Packaging

OS/2 2.1 is an upgrade to OS/2 2.0, and should be seen as an enhancement and replacement for OS/2 2.0. Although it is possible to continue using OS/2 2.0 (with the Service Pak XR06055 for OS/2 applied), and to apply further APAR fixes, OS/2 2.1 provides an enhanced and stable platform for the future, and we recommend that all users of OS/2 2.0, preloaded OS/2 2.00.1, and OS/2 2.0 with the Service Pak XR06055 for OS/2 applied should upgrade to OS/2 2.1. Figure 2 illustrates all of the upgrade routes to OS/2 2.1.

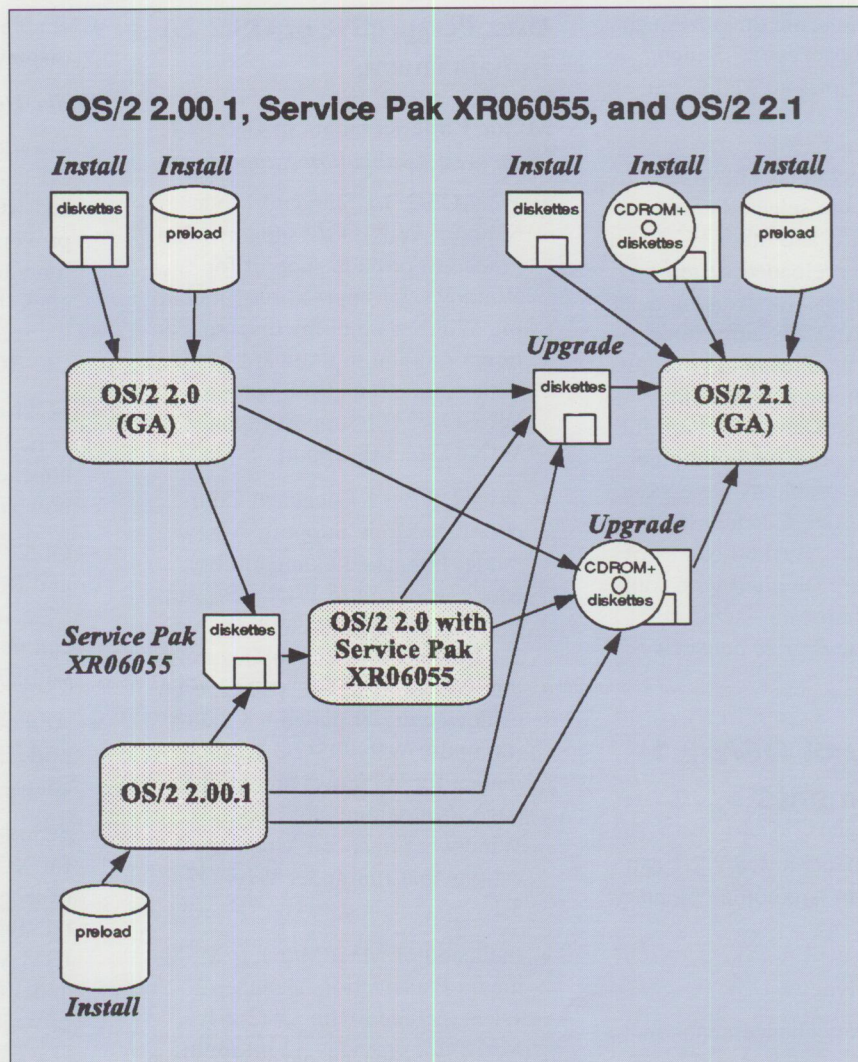


Figure 2. Upgrade Routes to OS/2 2.1

OS/2 2.1 is manufactured and sold in three different packages. All three contain the same enhancements and fixes.

**Full Package:** This package should be used by users who do not currently have OS/2 or DOS (with or without Windows) installed on their systems. The full package is sold and distributed in three formats:

- 3.5-inch diskettes
- 5.25-inch diskettes
- CD-ROM

The CD-ROM package also contains two 3.5-inch and two 5.5-inch installation diskettes that are needed for Initial Program Load (IPL) of OS/2 2.1.

**Upgrade Package:** This package is for users who currently have either OS/2 or DOS (with or without Windows) installed. When installing this version, OS/2 2.1 looks to see which operating system is currently installed on the system. If no operating system is found, OS/2 2.1 does not install. This upgrade package is



available in the same three formats as for the full package: 3.5-inch diskettes, 5.25-inch diskettes, and CD-ROM.

**Preloaded Package:** This package is preloaded onto selected computer systems by IBM and other PC manufacturers. The preloaded systems come with utilities for creating a set of bootable utility diskettes, uninstalling OS/2 features, and configuring the system setup. The utility diskettes that can be created are for supporting the preloaded computer system in case problems are encountered and the system cannot be booted normally. Backup copies of the diskettes are supplied with some computer systems; the inclusion of backup diskettes varies between countries.

## Summary of OS/2 2.1 Enhancements

The enhancements in OS/2 2.1 can be viewed from two complementary perspectives:

### User Perspective:

- What are the enhancements, in rough order of importance?
- Are these enhancements related to application support, internal changes to the operating system, or hardware support?
- What, in brief, does each enhancement provide?

### System Perspective:

- Which functional areas of OS/2 Version 2 have been enhanced?
- What enhancements have been added in each functional area?

This section provides an overview of the OS/2 2.1 enhancements from both perspectives.

## User Perspective of OS/2 2.1 Enhancements

### Major Enhancements in OS/2 2.1: Improved Application Support

- WIN-OS/2 3.1 Standard Mode Support: WIN-OS/2 support is upgraded to provide support for Windows 3.1 applications (including Windows multimedia applications) running in Standard Mode, both seamless and full-screen. WIN-OS/2 3.1 support replaces WIN-OS/2 3.0 support.
- WIN-OS/2 3.1 Enhanced Compatibility Mode Support: A new mode, Enhanced Compatibility Mode, is added to WIN-OS/2 support, enabling major Windows 3.1 Enhanced-Mode applications that do not require a specific type of device driver called a VxD to run under WIN-OS/2 3.1. Mathematica for Windows and Omni-page Professional are two Windows Enhanced-Mode applications that run under WIN-OS/2 3.1.
- Inclusion of MMPM/2 1.1: Multimedia Presentation Manager/2 1.1 is included with OS/2 2.1. MMPM/2 provides 32-bit multimedia support code for OS/2 PM multimedia applications, including Software Motion Video.

### Internal Operating System Upgrades

- WIN-OS/2 3.1 Performance Enhancements: Performance of Windows applications running under WIN-OS/2 is substantially improved, especially when running in seamless mode.
- 32-Bit PM Graphics Engine: This rewrite of the graphics engine provides a sound basis for future powerful graphics. The immediate benefit of this engine is that it

enables the new 32-bit seamless display drivers to be used.

### Wider Hardware Support

- Installation from CD-ROM: OS/2 2.1 can now be installed from CD-ROM. This is a major improvement that can save much time and energy. Installation diskettes (both 3.5-inch and 5.25-inch) are provided to start the CD-ROM installation process.
- SCSI-attached CD-ROM Support: IBM and non-IBM, SCSI-attached, CD-ROM devices are now supported.
- OS/2 2.1 Preloaded onto IBM and PC Manufacturer (PCM) PCs: IBM and non-IBM systems can now be supplied preloaded with OS/2 2.1.
- Additional SCSI Adapter Support: IBM and non-IBM SCSI adapters are now supported.
- Seamless 32-Bit Display Drivers for XGA, XGA-2, SVGA (Tseng, Headland, Western Digital, Trident, ATI, Cirrus, and IBM VGA 256-color), 8514/A, and VGA: These video drivers provide seamless integration of OS/2 PM and Windows 3.1 applications on the OS/2 desktop.
- Additional and Enhanced PM Printer Drivers: New and enhanced printer drivers, including drivers for the new high-speed printers, are provided in OS/2 2.1.
- Support for Windows 3.1 Printer and Display Drivers: The standard set of Windows 3.1 printer and display drivers is included in OS/2 2.1, and they can be used with WIN-OS/2.
- Advanced Power Management Support: OS/2 2.1 includes power-saving routines for note-



books and laptops that implement the APM specifications.

- PCMCIA Support: OS/2 2.1 includes support for notebooks and laptops that use the PCMCIA bus for adapters.

## **Significant Enhancements in OS/2 2.1:**

### ***Improved Application Support***

- Dual-Thread MVDM Support: This support enables many DOS multimedia applications to run smoothly, by providing threads inside the MVDM for simultaneously reading from disk, painting the screen, or playing sound.
- DOS\_AUTOEXEC Setting: A specific DOS command file can be run automatically when a VDM is created.
- Improved Clipboard and DDE Support: The Clipboard and DDE support in WIN-OS/2 are improved, substantially increasing performance, especially in exchanging data between WIN-OS/2 and OS/2 PM applications.
- Ability to Start a DOS or OS/2 Application from a Windows Application: It is now possible to "shell" to a DOS or OS/2 application from within a Windows application. This capability is especially useful for some Windows applications that depend on DOS utilities.
- Inclusion of Windows 3.1 File Manager and Selected Applets: Most Windows 3.1 applets, including File Manager, Write, and Paintbrush, are now included with WIN-OS/2 3.1.
- Improved WIN-OS/2 Setup and Configuration: The setup and configuration procedures for WIN-OS/2 applications are substantially improved, especially for Clipboard and DDE support.

### ***Internal Operating System Upgrades***

- Warning About ACL File Protection Before Installation: Before it starts, the OS/2 2.1 installation process checks for files or directories that are ACL-protected, because installation does not proceed if there is ACL protection.
- Page-Tuning Performance Enhancements: Improvements are made to the memory working set in the Control Program, with consequent performance improvements in low-memory situations.
- XCOPY Enhancements: The XCOPY utility is enhanced to copy across system and hidden files, and to retain the read-only attribute.
- Improved OLE Support in WIN-OS/2 3.1: The Object Linking and Embedding (OLE) support for compound documents is improved as a result of upgrading WIN-OS/2 to use Windows 3.1 code.
- TrueType Fonts in WIN-OS/2 3.1: The TrueType font technology and core fonts are included, also as a result of using the Windows 3.1 code.
- ISO Font Support: This provides a set of ISO fonts that meet the new ISO 9241-3 ergonomic standards on appropriate hardware.
- Improved .INI File Handling: The modules responsible for storing and reading application and Workplace Shell data from the OS2.INI and OS2SYS.INI files are improved and rewritten in 32-bit code to be faster and more reliable.

### ***Wider Hardware Support***

- Loadable BIOS Support: This feature provides the ability for BIOS to be loaded into RAM from BIOS files on disk, instead of using the BIOS in ROM. This capability is necessary for the PS/2\*\* Models 56 and 57, PS/2 Server 85, the ThinkPad\* 700 series notebooks, and any other PS/2 systems that use loadable BIOS rather than BIOS in ROM.
- Loadable BIOS Installation: This feature enables the BIOS files (which are shipped on the hardware reference diskette and on the system partition of the disk) to be installed on the boot disk as part of the OS/2 2.1 installation procedure. This capability is necessary for PS/2 systems that use loadable BIOS.
- Enhancements to Selective Install Program: The Selective Install program is enhanced for display driver, SCSI adapter, CD-ROM drive, and printer installation, and also to enable the user to install WIN-OS/2 accessories as an option at installation time.
- Display Driver Install Program: This program provides a simplified method for installing and configuring XGA, XGA-2, SVGA, and 8514/A display adapters, displays, and resolution modes.
- PS/2 Server 195 and 295 Support: OS/2 2.1 runs on the PS/2 Server 195 and PS/2 Server 295 systems. Previously, Server 195 and 295 support was limited to OS/2 1.3.
- Pentium\*\* Exploitation: OS/2 2.1 includes changes that exploit Intel's new Pentium processor. The first phase of this exploitation improves the performance of



DOS sessions through the use of Pentium virtual-mode extensions.

- **Page-Tuning Performance Enhancements:** The general performance of OS/2 2.1 is improved, especially in low-memory situations.
- **XGA-2 DMQS Override:** This feature enables the capabilities of advanced non-IBM displays to be exploited when they are attached to an XGA-2 adapter, by providing the ability to override the automatic XGA-2 display sensing (DMQS) with manual settings.
- **Enhanced Printer Installation:** User installation of additional printer drivers is simplified in OS/2 2.1.

#### **Minor Enhancements in OS/2 2.1: Improved Application Support**

- **OS2VER File:** Some applications check for a specific version number of OS/2 2.0 before they run. The OS2VER file enables these applications to be told that they are running on OS/2 2.0 even though they are really running on OS/2 2.1.
- **DPMI 1.0 Subset Support:** DPMI support has been upgraded to a subset of DPMI 1.0, enabling more DOS DPMI-based applications to run.
- **PC Support/400 Support:** The new, extended DOS version of PC Support/400 (V2R3), available during the second half of 1993, will run in an OS/2 2.1 VDM. This is due to the provision of multiple DPMI Client support as part of the DPMI 1.0 Subset support.
- **Multimedia Support for Audio in WIN-OS/2 3.1:** Windows 3.1 Multimedia support for Audio is included, again as a result of using the Windows 3.1 code.

- **Workplace Shell Visual Enhancements:** Minor improvements have been made to the appearance of the Workplace Shell, including a new notebook appearance and new icons for CD-ROM drives.
- **Settings Notebook Drag/Drop Enhancements:** It is now possible to add program objects to a folder menu, and to change the icon of any object using drag/drop on the desktop.
- **Auto-Lockup on System Startup:** The Workplace Shell can now be configured to enter lockup status automatically on system startup, thus ensuring that the user enters a password before using OS/2 2.1, and providing an additional level of security.
- **Print Spooler Enhancements:** The print spooler now enables the user to vary the priority.

#### **Internal Operating System Upgrades**

- **Palette Manager for XGA, XGA-2, SVGA, 8514/A:** Palette Manager support is provided for 256-color adapters, enabling the application programmer to provide specific color shades to applications.

#### **Wider Hardware Support**

- **Brazilian Keyboard Support:** The new national Brazilian keyboard is supported.
- **Trackpoint II\*\* Support:** The in-keyboard pointing device on the ThinkPad 700 series of notebook computers is supported.
- **Support for Enhanced 2.88 MB Diskette Drive:** The new 2.88 MB diskette drive, which provides support for software eject and software lock/unlock, is supported.

- **Support for 3.5-Inch Enhanced Rewritable Optical Drive:** The new 3.5-inch Enhanced Rewritable Optical drive, with support for P-ROM (partial read-only memory) optical disks, and with software lock/unlock and eject functions, is supported.
- **Format Utility Enhanced for P-ROM Optical Disks:** The OS/2 Format utility has been enhanced to support formatting P-ROM optical disks in the new 3.5-inch Enhanced Rewritable Optical Drive.
- **Large Cursor on VGA LCD Displays:** On VGA LCD displays on notebooks, a larger cursor can be displayed to make it more visible.
- **MSCDEX Support:** The VCDROM virtual device driver now supports all the CD audio functions of the Microsoft\*\* MSCDEX DOS device driver, thus enabling more DOS and Windows multimedia applications to run in VDMs.

### **System Perspective of OS/2 2.1 Enhancements**

Figure 3 is a simplified view of the OS/2 2.1 high-level system structure.

In the preceding section, the enhancements to OS/2 2.1 were divided into three groups:

- Application Support Environments
- Operating System Engines
- Hardware Support

These groups are shown as layers in Figure 3.

The system perspective of OS/2 2.1 divides the structure into several functional components:

- BIOS (CBIOS)
- ABIOS



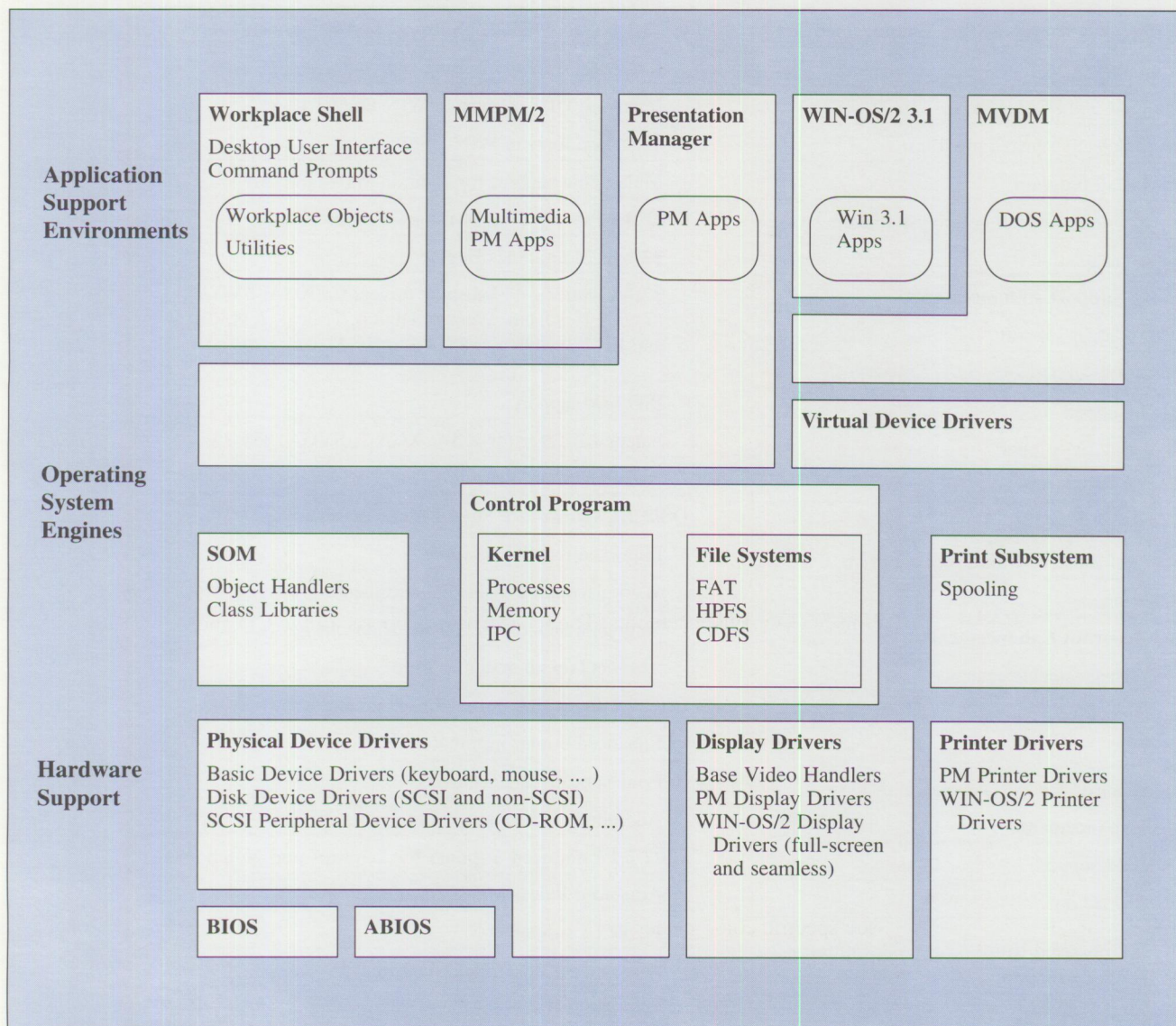


Figure 3. OS/2 2.1 - System Overview

- Physical device drivers
- Display drivers
- Printer drivers
- Control Program
  - Kernel
  - File Systems
- System Object Model
- Print Subsystem
- Virtual Device Drivers
- MVDM (DOS support)
- WIN-OS/2
- Presentation Manager
- MMPM/2 (multimedia support)
- Workplace Shell
  - Desktop User Interface
  - Command Prompts
  - Utilities

**OS/2 2.1 Enhancement Summary:**

The enhancements in OS/2 2.1 are listed on the next page as tables divided according to the above subsystems and functional components.



<b>OS/2 2.1 Installation and Configuration Enhancements</b>	
Installation from CD-ROM	
Preloaded onto IBM and PCM systems	
Enhancements to Selective Install program	
Display Driver Install program	
Warning on ACL File Protection before installation	
Loadable ABIOs installation	
<b>OS/2 2.1 Hardware Support Enhancements</b>	
Additional SCSI adapter support	
Additional CD-ROM support	
Loadable ABIOs support	
PS/2 Server 195 and 295 support	
Brazilian keyboard support	
Support for Enhanced 2.88 MB diskette drive	
Support for 3.5" enhanced rewritable optical drive	
Pentium exploitation	
<b>OS/2 2.1 Control Program Enhancements</b>	
Page tuning performance enhancements	
XCOPY enhancements	
OS2VER file	
Format Utility enhanced for P-ROM optical disks	
<b>OS/2 2.1 MVDM Enhancements</b>	
Dual-thread MVDM support	
DOS_AUTOEXEC setting	
DPMI 1.0 Subset support	
PC Support/400 (V2R3) support	
MSCDEX support	
<b>OS/2 WIN-OS/2 3.1 Support and Enhancements</b>	
WIN-OS/2 3.1 Standard Mode support	
WIN-OS/2 3.1 Enhanced Compatibility Mode support	
WIN-OS/2 3.1 performance enhancements	
Seamless WIN-OS/2 display drivers for XGA, SVGA (Tseng, Headland, Western Digital, Trident, ATI, Cirrus, and IBM Speedway), 8514 and VGA.	
Support for Windows 3.1 printer drivers	
Improved Clipboard and DDE support	
Ability to start a DOS or OS/2 application from a Windows application	
Inclusion of Windows 3.1 File Manager and selected accessories	

<b>OS/2 2.1 WIN-OS/2 3.1 Support and Enhancements (cont.)</b>	
Improved WIN-OS/2 setup and configuration	
Improved OLE support in WIN-OS/2 3.1	
TrueType fonts in WIN-OS/2 3.1	
Multimedia support for audio in WIN-OS/2 3.1	
<b>OS/2 2.1 Presentation Manager Enhancements</b>	
32-bit PM Graphics Engine	
32-bit seamless PM display drivers for XGA, SVGA (Tseng, Headland, Western Digital, Trident, ATI, Cirrus, and IBM Speedway), 8514 and VGA	
ISO font support	
Palette Manager for XGA, XGA-2, SVGA, 8514/A	
XGA-2 DMQS override	
<b>OS/2 2.1 Workplace Shell Enhancements</b>	
Improved INI file handling	
Workplace Shell visual enhancements	
Settings notebook drag/drop enhancements	
Auto-lockup on system startup	
<b>OS/2 2.1 Print Subsystem Enhancements</b>	
Enhanced printer installation	
Print Spooler enhancements	
Additional and enhanced PM printer drivers	
<b>OS/2 2.1 Enhanced Support for Laptops and Notebooks</b>	
Advanced Power Management support	
PCMCIA support	
Large cursor on VGA LCD displays	
Trackpoint II support	
<b>OS/2 2.1 Multimedia Support</b>	
Inclusion of MMPM/2 1.1 with OS/2 2.1	
Software Motion Video	
Multimedia device drivers	
MMPM/2 applets	
MMPM/2 utilities	
MMPM/2 installation	
Media Control Interface subsystem	
Stream Programming Interface subsystem	
Multimedia I/O Services subsystem	
Additional multimedia controls	
Applications for MMPM/2	



## Installation and Configuration of OS/2 2.1

The OS/2 2.1 product package includes the *OS/2 2.1 Installation Guide*, which provides good documentation for installing OS/2 2.1, and should be your initial reference.

Although installation of OS/2 2.1 from diskette is fundamentally similar to installation of OS/2 2.0, there are enhancements and special features, and a new CD-ROM alternative has been provided. This chapter focuses on these differences and on any special considerations for OS/2 2.1 installation.

Differences in installing OS/2 2.1 compared to installing OS/2 2.0 include:

- Installation of OS/2 2.1 from CD-ROM
- Enhancements to the Selective Install program, for:
  - SCSI adapter support
  - CD-ROM device support
  - Display driver support (including SVGA adapters)
  - Default printer installation
  - Control over WIN-OS/2 3.1 installation
- A new Display Driver Install program, DSPINSTL

Special considerations for OS/2 2.1 installation include

- Installation of OS/2 2.1 on loadable BIOS systems
- Upgrade installation of OS/2 2.1 on ACL-protected systems
- SVGA display driver installation and configuration

- XGA display driver configuration

Remote and CID-enabled installation of OS/2 2.1 have also been enhanced, and are described in companion bulletins from the IBM International Technical Support Center: *OS/2 Version 2.1 Remote Installation and Maintenance* (GG24-3780-01) and *Automated Installation for CID-Enabled OS/2 V2.1* (GG24-3783-01).

### CD-ROM Installation of OS/2 2.1

OS/2 2.1 introduces the ability to install from CD-ROM. This is a much easier and faster way of installing OS/2 2.1 than from diskettes, and is suggested whenever a CD-ROM drive is available.

The CD-ROM installation process requires that the computer system be booted from two diskettes, which are supplied along with the CD-ROM and are different from the standard OS/2 2.1 boot diskettes. Booting from diskette is necessary to load the SCSI adapter, CD-ROM device drivers, and the CD file system.

Installation from SCSI-based CD-ROM is supported by device drivers furnished with OS/2 2.1.

### Enhancements to the Selective Install Program

The Selective Install program can be used automatically during initial OS/2 2.1 installation. Subsequently, it can be started at any time to install additional OS/2 2.1 features. To start it, simply double-click on the Selective Install icon in the System Setup folder. Finally, Selective Install can also be started by typing Install from the command prompt with the boot drive as the default drive.

Before starting the Selective Install procedure, make sure that you do not have any Windows programs started, because OS/2 is unable to complete the installation until all Windows programs have been closed.

The Selective Install program has been significantly enhanced in OS/2 2.1 in the areas of:

- SCSI adapter support
- SCSI-based CD-ROM support
- Display driver support (for XGA, XGA-2, SVGA, and 8514/A adapters)
- Default printer installation
- Control over WIN-OS/2 3.1 installation

When Selective Install is started (either automatically or explicitly), the System Configuration screen, shown in Figure 4, is displayed. By selecting checkboxes on this screen, then clicking on OK, further dialogs are displayed. These dialogs can be used to specify installation details for SCSI adapter support, CD-ROM device support, display drivers, and default printer support.

By selecting checkboxes on this screen and clicking on OK, further dialogs are displayed that can be used to install SCSI adapter support, CD-ROM device support, display drivers, and default printer support.

When all the options on this screen have been specified, click on OK to display the OS/2 Setup and Installation screen, as shown in Figure 5.

This panel can be used to select optional features of OS/2 2.1 to install. Unlike the System Configuration screen, selecting a checkbox only se-



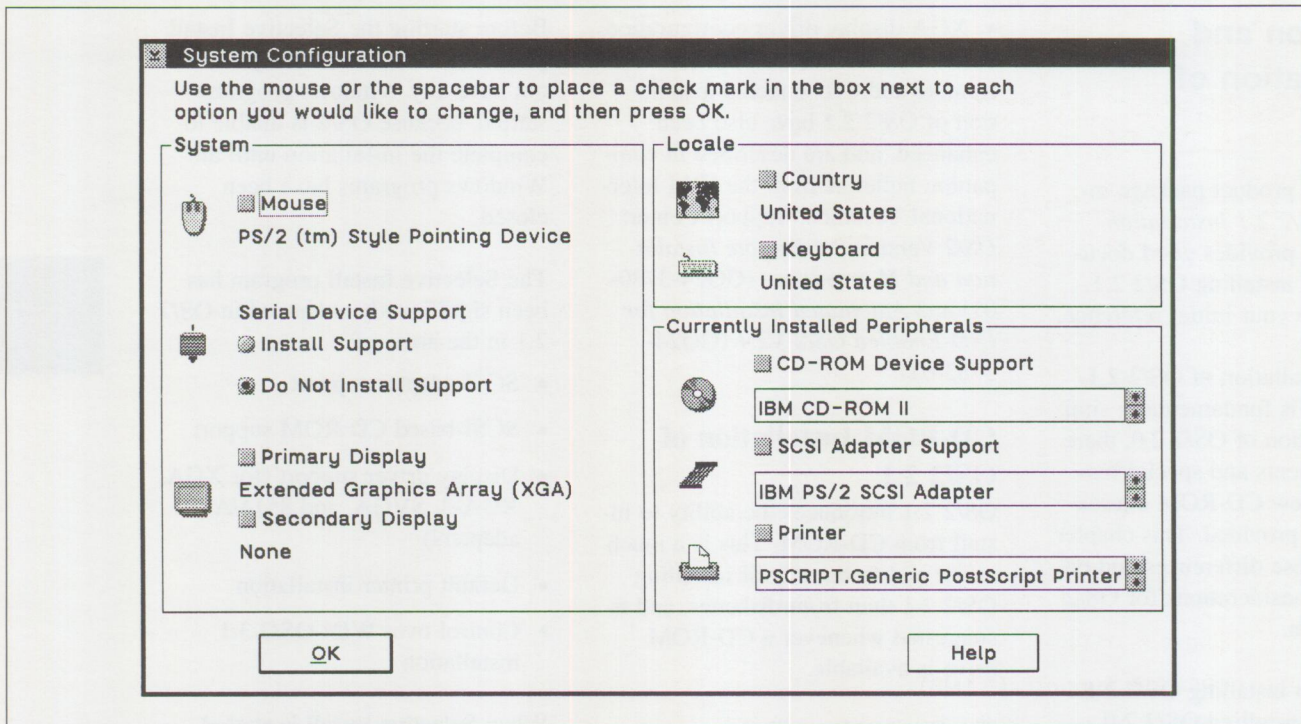


Figure 4. Selective Install - System Configuration

lects the item for installation; it does not automatically display a further dialog.

Click on the More... pushbutton to change the default parameters for installation of each option. For example, the More... pushbutton corresponding to WIN-OS/2 Support provides the way of controlling the selective installation of WIN-OS/2 3.1.

The disk space calculation at the bottom right corner of the screen in Figure 5 shows how much free space is available on the disk, and also how much space is needed to install the features currently chosen for Selective Install. The calculation automatically takes into account the disk space required for installation of the essential parts of OS/2 2.1.)

When all the options on this screen have been specified, click on Install

to start the installation process. If this is the initial OS/2 2.1 installation, then prompts are issued for the full set of OS/2 2.1 installation diskettes; if this is a Selective Install, then prompts are issued for only the required diskettes.

After installation is complete, the system normally needs to be rebooted so that the changes can take effect (since new device drivers have to be loaded). If Selective Install was explicitly started, then a message box is displayed, stating that the system must be shut down and restarted in order for changes to take effect.

**CD-ROM Support Installation**  
Using Selective Install: CD-ROM drive support can be installed by following the instructions below, starting from the System Configuration screen shown in Figure 4.

1. Select the checkbox beside the CD-ROM Device Support option.
2. Click on OK. The Select CD-ROM Device(s) window, shown in Figure 6, is displayed.
3. Select the listbox item(s) for the CD-ROM devices for which you want to install support.
4. Click on OK. The System Configuration window is re-displayed.
5. When all the options on the System Configuration screen have been set, Selective Install moves on to the OS/2 Setup and Installation Screen.
6. When all the options on the OS/2 Setup and Installation screen have been set, click on Install to start the installation process.



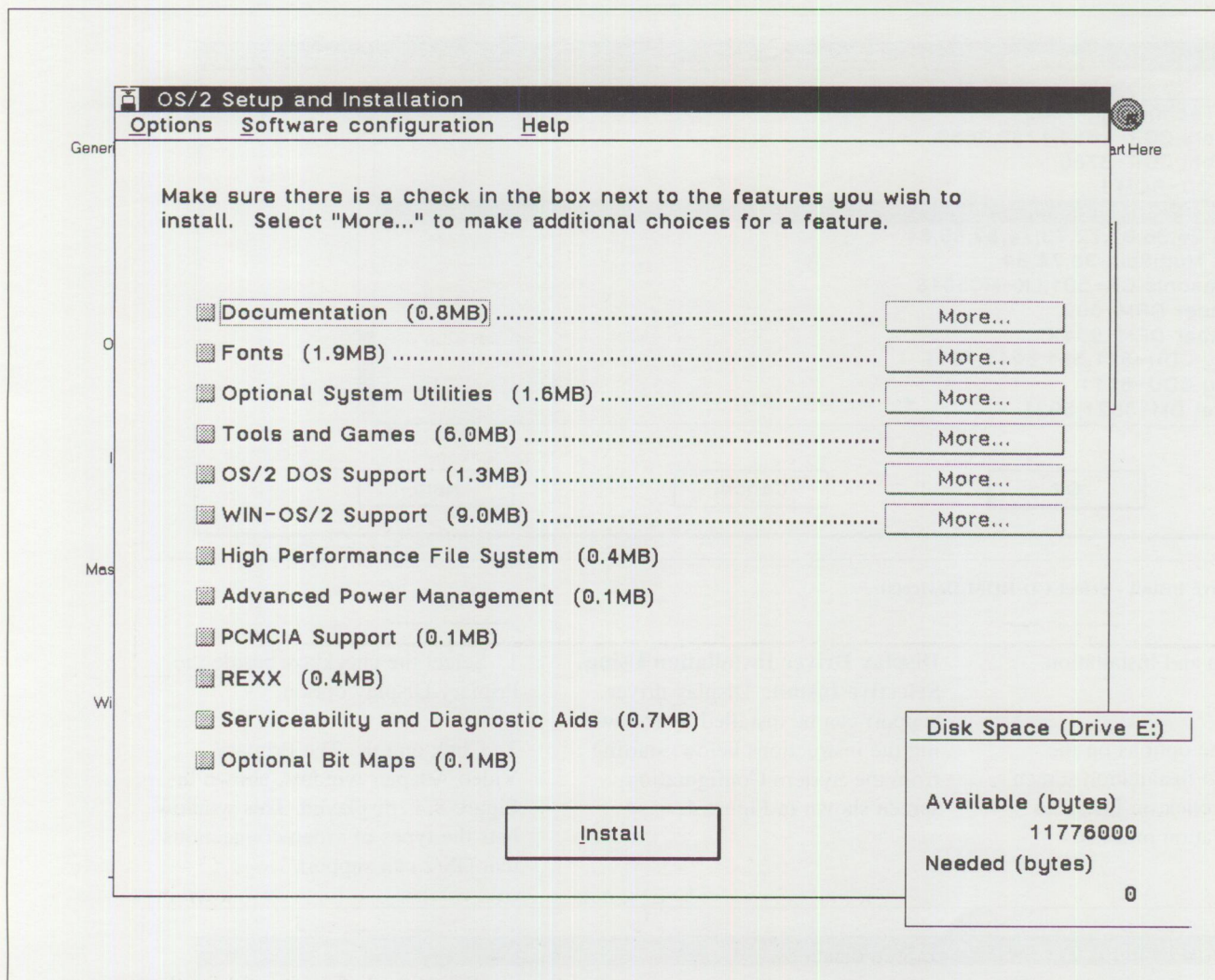


Figure 5. Selective Install - OS/2 Setup and Installation

The SCSI-based CD-ROM support has been architected with a "pluggable" design that allows additional SCSI-based CD-ROM drivers to be manually installed when they become available from third-party vendors.

**Warning:** Some combinations of SCSI adapter cards and CD-ROM devices are not supported. Check the list in OS/2 2.1: *Using the Operating System* to verify that your combination of adapter and CD-

ROM drive is supported by OS/2 2.1.

#### SCSI Adapter Support

**Installation Using Selective Install:** SCSI adapter support can be installed by following the instructions below, starting from the System Configuration screen shown in Figure 4.

1. Select the checkbox beside the SCSI Adapter Support option.

2. Click on OK. The Select SCSI Adapters window, shown in Figure 7, is displayed.

3. Select the listbox item(s) for the SCSI adapters for which you wish to install support.

4. Click on OK. The System Configuration window is re-displayed.

5. When all the options on the System Configuration screen have been set, Selective Install moves on to



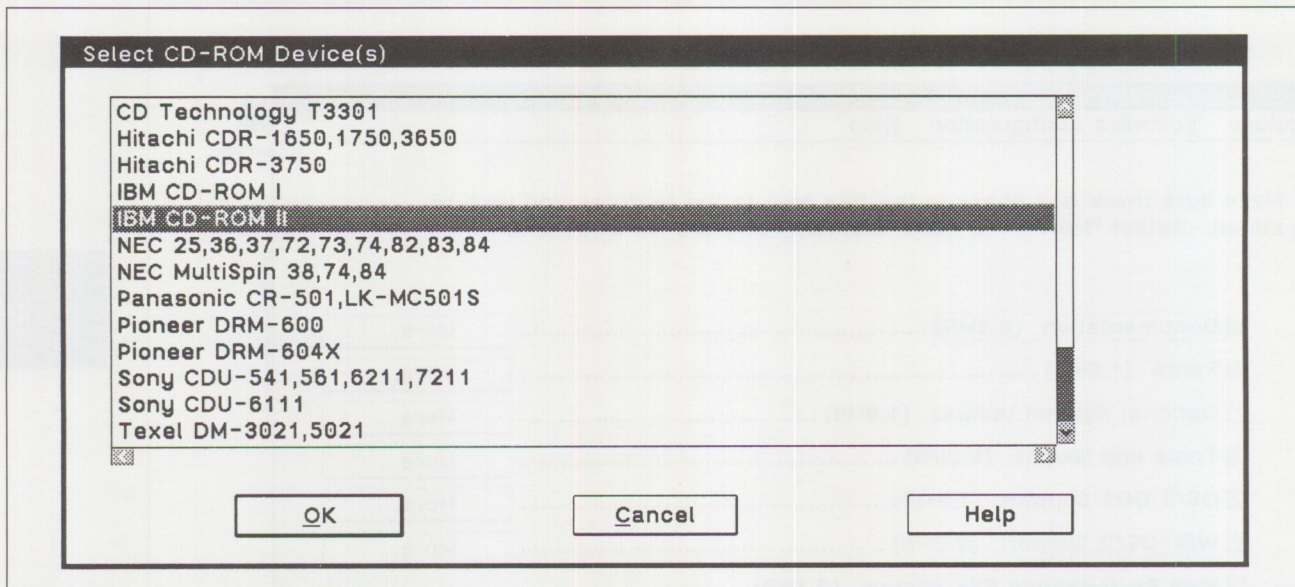


Figure 6. Selective Install - Select CD-ROM Device(s)

the OS/2 Setup and Installation Screen.

6. When all the options on the OS/2 Setup and Installation screen have been set, click on Install to start the installation process.

**Display Driver Installation Using Selective Install:** Display driver support can be installed by following the instructions below, starting from the System Configuration screen shown in Figure 4.

1. Select the checkbox beside the Primary Display option.

2. Click on OK. The Primary Video Adapter window, shown in Figure 8, is displayed. This window lists the types of video connections that OS/2 can support.

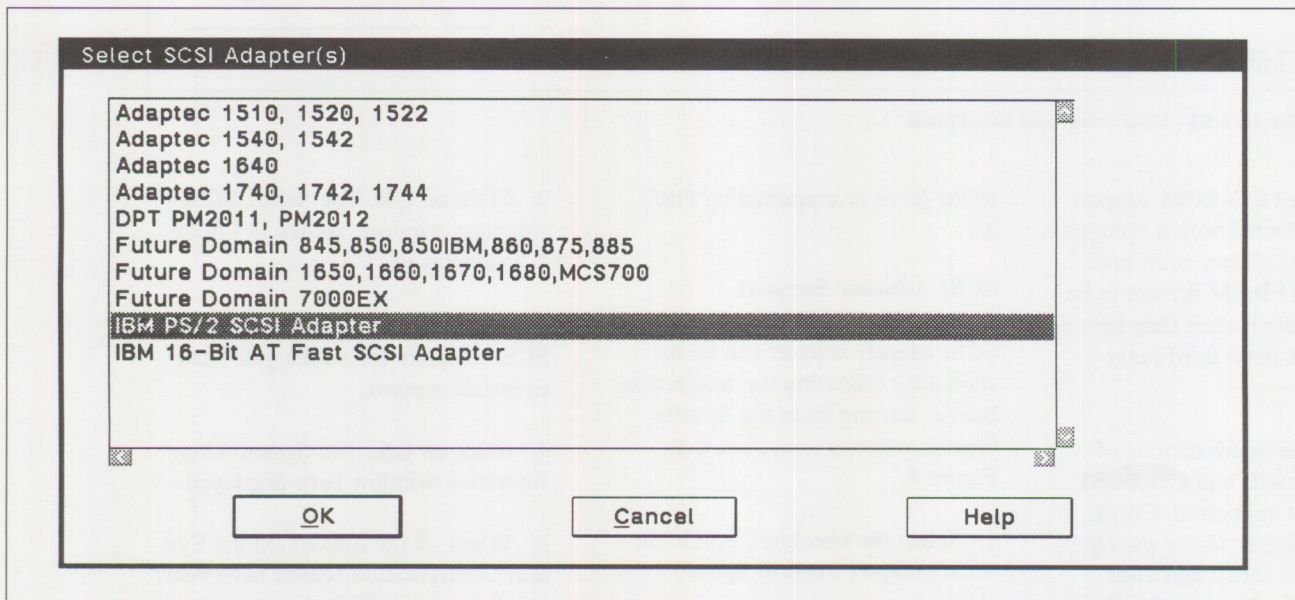


Figure 7. Selective Install - Select SCSI Adapters



At this stage, OS/2 does not check the video adapter to determine whether the adapter is supported by OS/2. This check is done at the end of the installation, just before OS/2 2.1 prompts for the display driver diskettes. To ensure that your adapter is supported by OS/2, consult the list of supported SVGA adapters.

3. Select the radio button for the SVGA option or other display adapter installed on your system.

4. Click on OK. The System Configuration window is re-displayed.

5. When all the options on the System Configuration screen have been set, Selective Install moves on to the OS/2 Setup and Installation Screen.

6. High-resolution fonts are automatically installed. If you want to install the ISO fonts, then click on More... opposite the Fonts checkbox, and ensure that all the fonts are selected in the Fonts window, shown in Figure 9.

7. Click on OK to return to the OS/2 Setup and Installation screen.

8. When all the options on the OS/2 Setup and Installation screen have been set, click on Install to start the installation process.

9. OS/2 now checks to establish which display adapter is installed in the computer system, and looks at its chip set to determine which resolution it supports. For SVGA, there are different display drivers for each resolution; for XGA and XGA-2, one display driver supports all resolutions.

At this stage, if you have an SVGA adapter, the Monitor Configuration screen is displayed. One option on

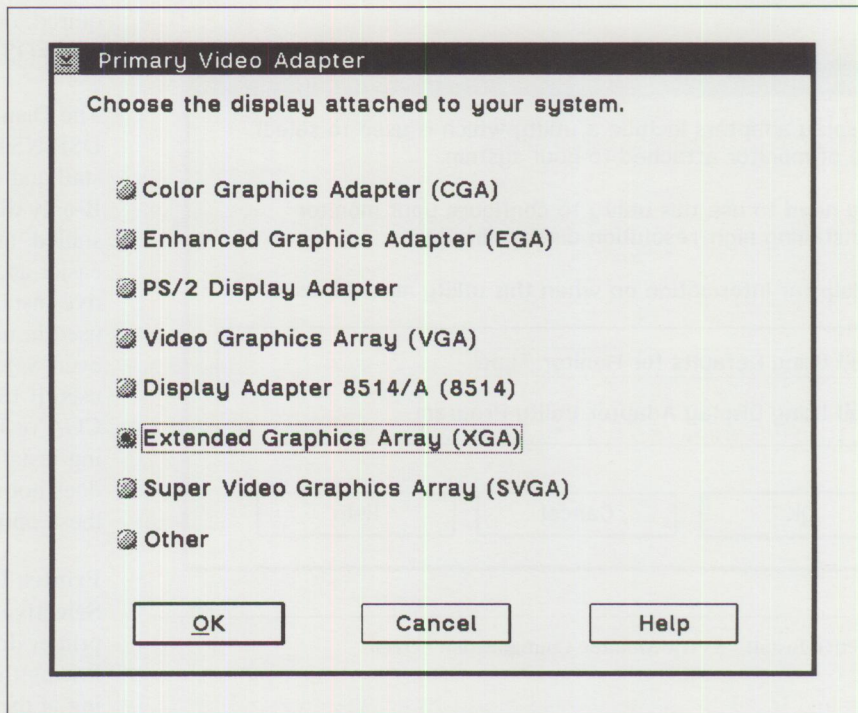


Figure 8. Selective Install - Primary Video Adapter

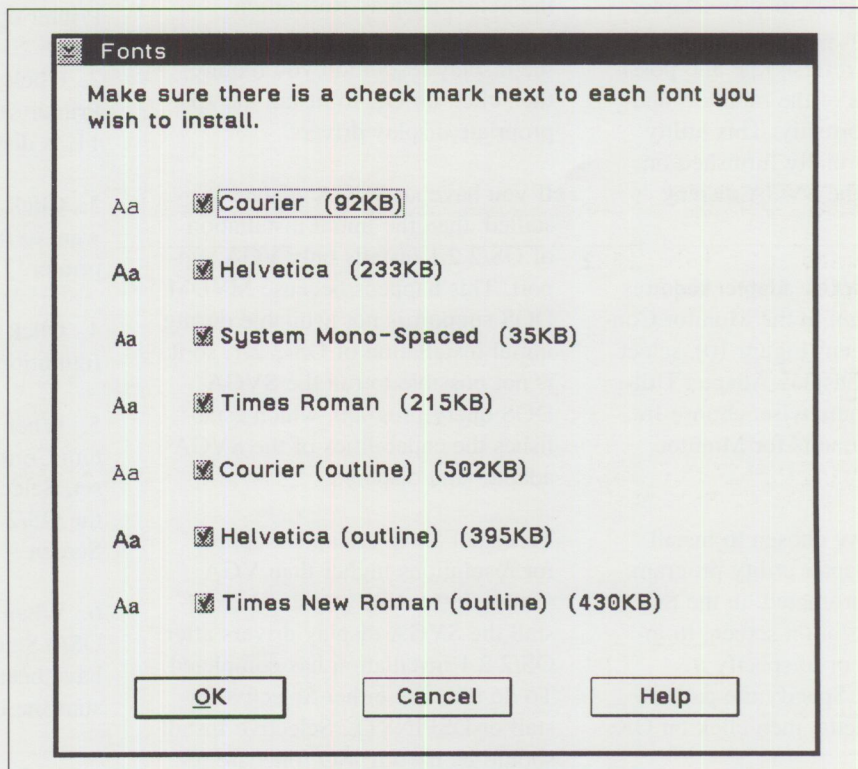


Figure 9. Selective Install - Fonts



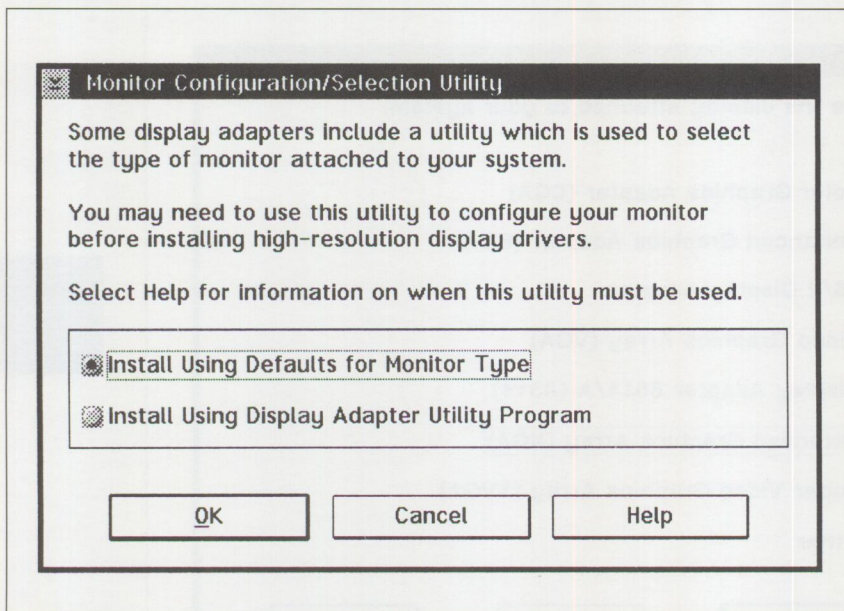


Figure 10. Selective Install - SVGA Monitor Configuration Screen

that screen lets you install a display adapter utility program from diskette. Some SVGA display adapters need to use a DOS display adapter utility program, so that the adapter can know the refresh rate and possible resolutions of the monitor, and configure it correctly. This utility program is normally furnished on diskette with the SVGA display adapter.

10. If your SVGA adapter requires this utility, then, in the Monitor Configuration screen (Figure 10), select Install Using Display Adapter Utility Program; otherwise, choose Install Using Defaults for Monitor Type.

11. If you have chosen to install the display adapter utility program, you are next prompted, in the Selection Utility Location screen, to insert a diskette or to specify a different path. Specify the path or insert the diskette, then click on OK.

12. Selective Install of the display driver continues by prompting you to choose the display resolution in the Select Display Resolution screen. Select the list box item for the display resolution you require, then click on OK to install the appropriate display drivers.

If you have an SVGA adapter installed, then the initial installation of OS/2 2.1 installs only VGA support. This happens because MVDM DOS support is not available during initial installation of OS/2 2.1, so it is not possible to run the SVGA DOS query program, which establishes the capabilities of the SVGA adapter and display.

To install SVGA adapter support for resolutions higher than VGA (640 x 480 x 16), you should reinstall the SVGA display drivers after OS/2 2.1 installation has completed. To do this, use either Selective Install or DSPINSTL. Selective Install should be used if ISO fonts are re-

quired; otherwise, we recommend using DSPINSTL.

The Display Driver Install program DSPINSTL can also be used to install and configure display drivers. If only display drivers are being installed, then using DSPINSTL is easier and faster than using Selective Install. DSPINSTL should be used in normal circumstances. However, Selective Install should be used if ISO fonts are required, or if CGA or EGA adapter support is being installed, because DSPINSTL does not support installation of these options.

### Printer Installation Using

**Selective Install:** The default printer driver can be installed by following the instructions below, starting at the System Configuration screen shown in Figure 4.

1. Select the checkbox beside the Printer option.
2. Click on OK. The Select Printer(s) window, shown in Figure 11, is displayed.
3. Click on the printer that you want to install as your default printer.
4. Click on OK. The System Configuration window is re-displayed.
5. When all the options on the System Configuration screen have been set, Selective Install moves on to the OS/2 Setup and Installation Screen.
6. When all the options on the OS/2 Setup and Installation screen have been set, click on Install to start the installation process.



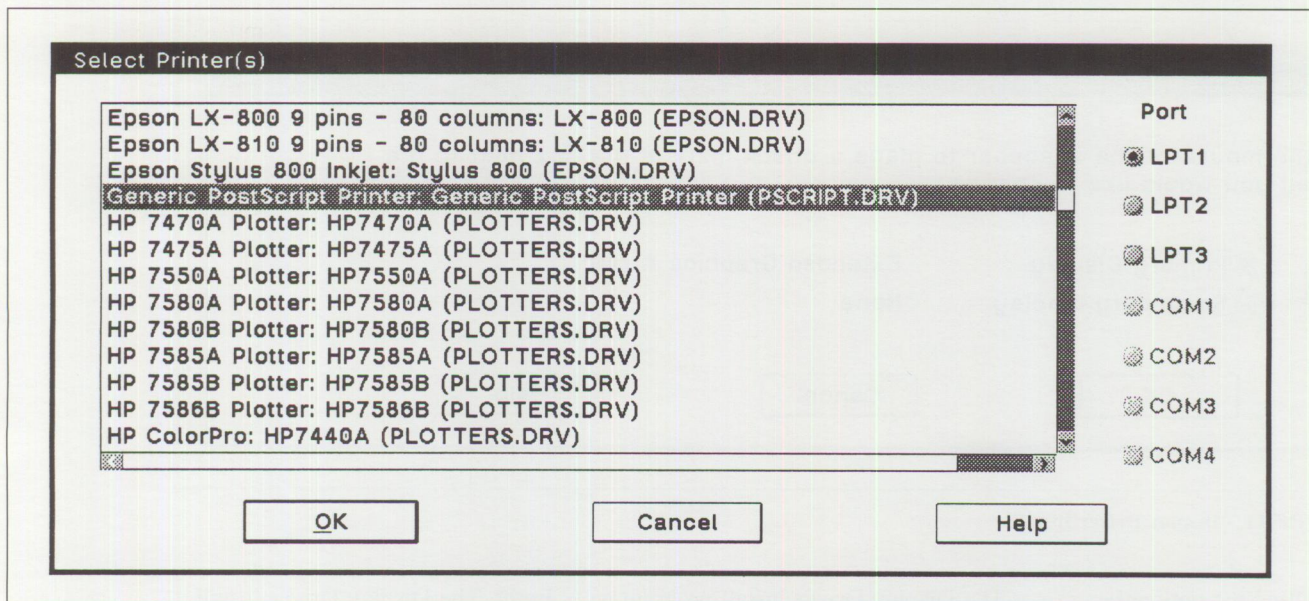


Figure 11. Selective Install - Select Printer(s)

### Selective WIN-OS/2 3.1

**Installation:** Two changes have been made to increase the flexibility of WIN-OS/2 3.1 installation, and to avoid running out of space when installing OS/2 2.1 on small disk partitions.

- It is now possible to install WIN-OS/2 3.1 onto a different drive from the rest of OS/2 2.1. This capability can be useful in cases where the computer system has two or more smaller disk partitions, since the disk requirements of OS/2 2.1 have increased over those of OS/2 2.0.
- Windows applets can be selectively installed. The default is to install all the applets. If Windows applets are not selected for installation, the amount of disk space needed for WIN-OS/2 3.1 decreases.

On the OS/2 Setup and Installation screen (Figure 5), ensure that the checkbox for WIN-OS/2 Support is selected. (DOS support is automatically installed if WIN-OS/2 support

is selected. Then click on More... to display the WIN-OS/2 Support screen shown in Figure 12.

By default, all WIN-OS/2 3.1 files are installed, to the same disk drive

as the rest of OS/2 2.1. To change the drive on which to WIN-OS/2 3.1, perhaps because there is insufficient space on the default drive, use the Destination Drive spin button to choose another drive.

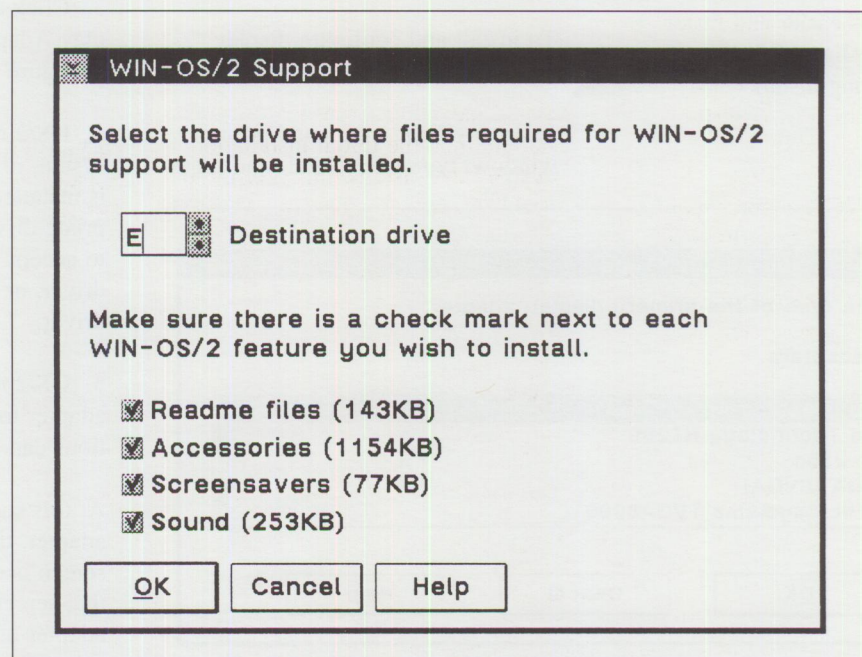


Figure 12. Selective Install - WIN-OS/2 3.1 Installation Parameters



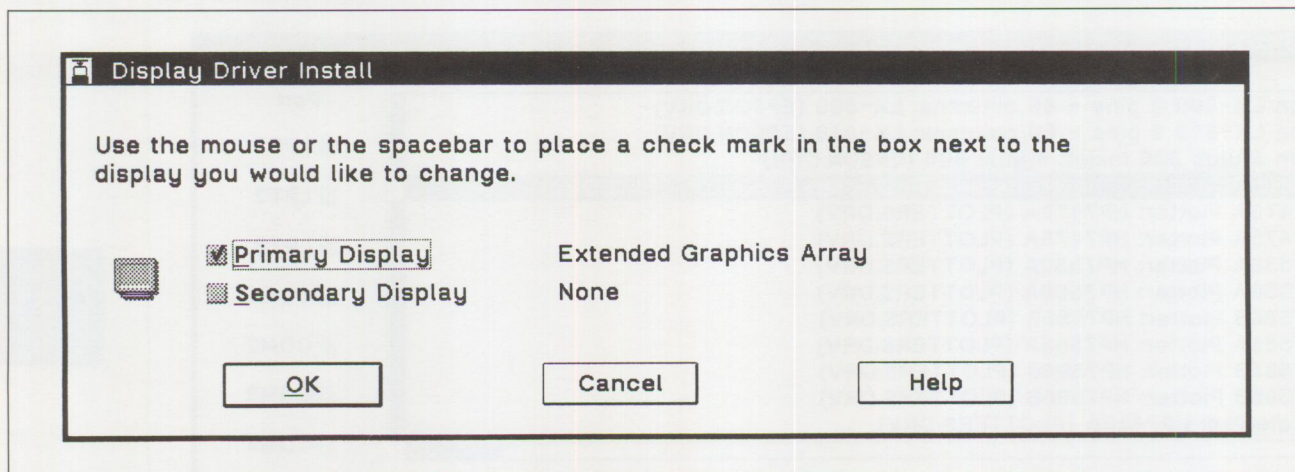


Figure 13. DSPINSTL - Display Driver Install

To avoid installing the optional WIN-OS/2 3.1 files, deselect the checkboxes next to any or all of the optional WIN-OS/2 features.

### Display Driver Install Program

The Display Driver Install program, DSPINSTL, provides an alternate method of installing display drivers. This method is easier and faster than Selective Install if only display drivers are being installed.

The Display Driver Install program can be started by typing DSPINSTL at an OS/2 command line.

Before starting this procedure, make sure that you do not have any Windows programs started, because OS/2 cannot complete the installation until all Windows programs have been closed.

To install and configure display drivers, follow these instructions:

1. In any OS/2 command prompt window, type DSPINSTL and press

Enter. The Display Driver Install window is displayed, as shown in Figure 13.

2. Select the checkbox beside the Primary Display option. If you plan to connect two displays, make sure you configure the primary display for the higher resolution.

3. Click on OK. The Primary Display Adapter Type window, shown in Figure 14, is displayed.

4. OS/2 now checks your computer system to determine which adapter is installed, and preselects the appropriate driver for you. Click on OK to accept the preselected display driver, or select another display driver.

5. OS/2 now checks your video adapter to determine which resolutions can be supported.

At this stage, if you have an SVGA adapter, the Monitor Configuration screen is displayed. One option on that screen lets you install a display adapter utility program from diskette. Some SVGA display adapters need to use a DOS display adapter

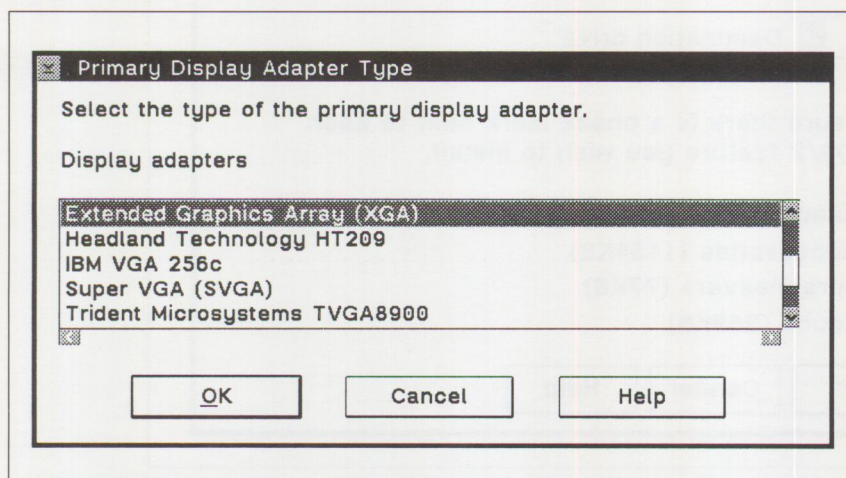


Figure 14. DSPINSTL - Primary Display Adapter Type



utility program, so that the adapter can know the refresh rate and possible resolutions of the monitor, and configure it correctly. This utility program is normally furnished on diskette with the SVGA display adapter.

6. If your SVGA adapter requires this utility, then, in the Monitor Configuration screen, select Install Using Display Adapter Utility Program; otherwise, choose Install Using Defaults for Monitor Type.

7. If you have chosen to install the display adapter utility program, you are next prompted, in the Selection Utility Location screen, to insert a diskette or to specify a different path. Specify the path or insert the diskette, then click on OK.

8. The Display Driver Install program then queries the adapter and monitor to determine the possible resolutions. You are then presented with the Select Display Resolution screen, shown in Figure 15, which prompts you to choose the display resolution. Select the listbox item for the display resolution required.

9. Click on OK. The Source Directory window, shown in Figure 16, is displayed.

10. Either select the default directory, or change the pathname so it points to drive A:. If you specify drive A: as the path, you will need the display driver diskettes.

11. Click on Install. OS/2 starts the installation. When the installation ends, the Display Driver Install message window is re-displayed. Click on OK.

12. To activate the changes, shut down your system and restart it.

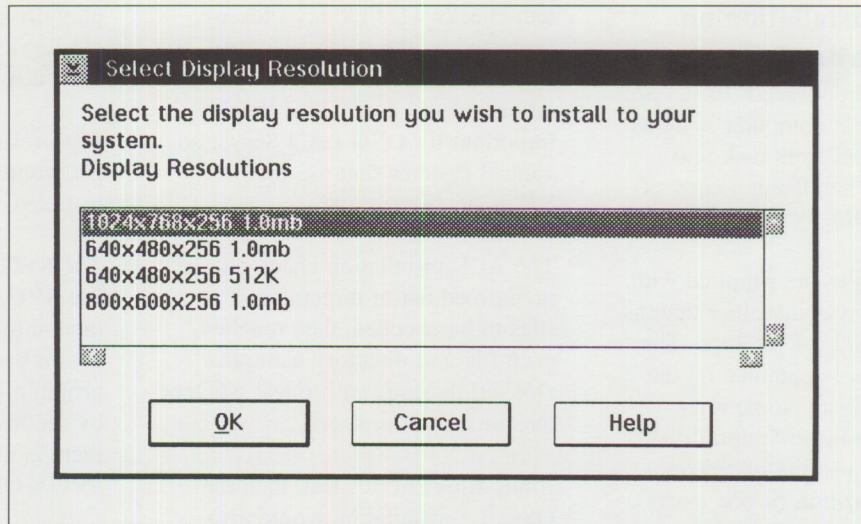


Figure 15. DSPINSTL - Select Display Resolutions

If you later want to change the SVGA display resolution, you must use this DSPINSTL procedure again. This is because there are different SVGA display driver sets for each SVGA display resolution (unlike XGA, where one display driver set supports all resolutions).

DSPINSTL does not handle the copying or installation of ISO fonts.

If you have an ISO-compliant machine with an ISO adapter and ISO display, and you want ISO font support, then you must install the fonts again after running DSPINSTL. In this case, it would normally be faster and easier to use Selective Install for both display driver and ISO font installation.

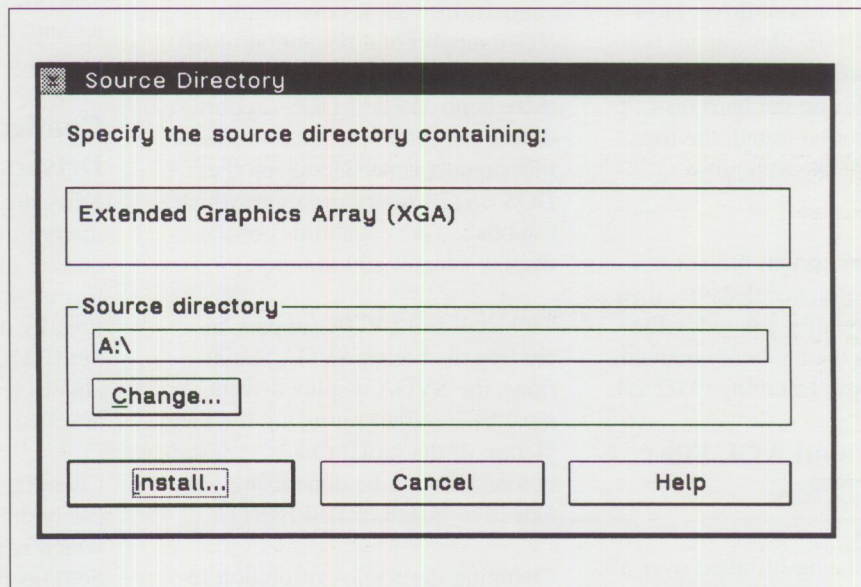


Figure 16. DSPINSTL - Source Directory



## OS/2 2.1 Installation on Loadable ABIOS Systems

Some of the more recent IBM PS/2 Micro Channel\* computer systems load the ABIOS from disk into RAM, rather than using a copy of ABIOS in ROM.

The ABIOS files are supplied with the computer system, rather than as part of the OS/2 2.1 package. The ABIOS files are contained on the Reference diskette (sometimes called the Hardware Support diskette), and are also preloaded onto the system partition (if one exists). The system partition is also known as the Initial Machine Load (IML) partition.

During the installation of OS/2 2.1 on a PS/2 system with loadable ABIOS, the installation procedure first tries to access the system partition on the hard disk, using a special device driver that enables the system partition to be accessed as a standard drive. This device-driver approach works for PS/2 models 9556, 9557, and 9585. If it is successful, the ABIOS files are copied onto the OS/2 2.1 boot drive. However, if the ABIOS files cannot be found, the system first tries to find the ABIOS files on the hard disk; if they still cannot be found, the user is prompted for the Reference diskette.

If the computer system did not come with a reference diskette, then you must create one, following the instructions in the hardware manual, before you begin installing OS/2 2.1.

### Warning About ACL File Protection Before Installation

If OS/2 2.1 is being installed over a previous version of OS/2, the sys-

tem checks whether any files are protected by the Access Control List (ACL) before starting the installation process itself. This check is important for OS/2 LAN Server advanced systems that use the HPFS386 file system.

The ACL installation check uses a predefined list of directories and files to be checked, then touches each file and directory using the DosSetFileMode call to test whether the file can be replaced.

If any files fail this test, then the OS/2 2.1 installation would also fail, so the ACL check produces a list of files protected by ACL, then aborts the installation. The user should then remove the ACL protection from these files, then restart the OS/2 2.1 installation.

The ACL check is also done during installation of the Service Pak.

### Configuring SVGA Display Drivers

The initial OS/2 2.1 installation of SVGA does not install full SVGA support; instead, it only installs VGA support at a resolution of 640 x 480 x 16. This happens because there is no MVDM DOS support during the initial installation phase; this support is needed to run the DOS SVGA query program, which establishes the capabilities of the display adapter and monitor.

To install full SVGA support, including the higher SVGA resolutions, the SVGA display drivers must be installed following the completion of the initial OS/2 2.1 installation. This can be done using either Selective Install or DSPINSTL.

Changing the SVGA resolution requires reinstallation of SVGA dis-

play drivers, since there is a different SVGA display driver set for each display resolution.

High-resolution fonts, except for ISO fonts, are automatically installed.

The SVGA.EXE program creates a file SVGADATA.PMI, which contains information about the capabilities of the SVGA adapter. This program is now run automatically by the installation programs, and there is no need to explicitly run SVGA ON in OS/2 2.1.

#### Warnings:

(1) If you select a resolution that is not supported by your SVGA adapter/display combination, then your screen may be blank when OS/2 2.1 is rebooted. It is worth checking that the resolution is supported by the SVGA adapter/display combination before configuring it.

(2) Do not use the SVGA OFF command, because it erases the SVGADATA.PMI file, which is needed by the SVGA display driver support. Erasing this file will cause a blank screen to appear when the system is restarted.

### Configuring XGA Display Drivers

XGA display driver installation normally functions correctly, because one set of XGA display drivers satisfies all screen resolutions. In addition, by using Display Mode Query Set (DMQS), the XGA-2 adapter is able to sense which display is attached.

Changing the screen resolution is easily done using the Screen page, which is added at the start of the Settings notebook of the System object. Sometimes this is also referred



to as Static Mode Switching, because the resolution can be changed without reinstallation of display drivers.

The DMQS procedure enables the XGA-2 adapter to ascertain the capabilities of the attached screen, such as resolutions supported. Therefore, the highest available resolution can be selected automatically during installation. Once the XGA drivers have been installed, you can easily change your XGA display resolution by using the System icon, contained in the System Setup folder.

In the System icon's Settings notebook, the first panel contains one page for XGA and two pages for XGA-2. The first page lets you select the desired resolution; the second page (on XGA-2 systems) allows you to define the type of screen attached to the computer system.

In most cases, OS/2 can recognize the type of display attached, and furnishes the corresponding .DGS driver. Sometimes, however, the reply from a non-IBM display to the DMQS query by the XGA-2 adapter does not match the capabilities of the display. In these cases, DMQS Override can be used to manually override the settings. The overriding is done by using the drop-down menu of possible displays. Doing this enables OS/2 2.1 to exploit the full capabilities of the display.

### Preloaded OS/2 2.1

OS/2 2.1 is preloaded onto selected systems by IBM and other PC manufacturers. Preloaded systems contain utilities for creating a set of bootable utility diskettes, removing OS/2 features, and configuring the system setup.

The utility diskettes that can be created are for supporting the preloaded system in case problems are encountered and the system cannot be booted normally. These diskettes include copies of the FDISK, FORMAT, CHKDSK, and BACKUP/RESTORE programs.

The utility for removing OS/2 features enables the user to reclaim hard disk space by removing items from the computer system.

The configuration program allows the user to change the configuration support without inserting diskettes. Preloaded systems come with all features installed, and have extra directories that contain files needed for changing the configuration. No printer is configured (this is left for the user), and the systems are preconfigured for VGA display support.

These programs, along with a set of tutorials, service information, and a system information tool, are in a folder on the Desktop called Preinstalled Essentials (formerly called the Welcome folder). In the shipping carton of the computer system is a book called Using Your Preinstalled System, which explains how to use these programs and utilities.

Backup copies of the diskettes are supplied with some systems; the inclusion of backup diskettes varies among countries.

## Optimizing Your Usage of OS/2

This section is intended for users of OS/2 who may not have in-depth experience with computer systems, but who have been using OS/2 to some extent and have taken the OS/2 Online Tutorial. Some of the information in this section can also be

found in the "Start Here" application, which is loaded on the Workplace Shell desktop at installation time.

If you experience difficulty operating OS/2, it is important to seek assistance before going any further. OS/2 and its graphical user interface are intended to be intuitive and easy to use, but this will vary depending on your own conventions and customs.

## Setting Performance Expectations

It is important to have a realistic approach to gauging the performance of your system. The capabilities of OS/2 are enormous compared to those of single-tasking operating systems. However, many users immediately begin to run many applications at once, and soon realize that their system's performance is not as good as it was with only one application active. Matching the processing power to the tasks that a computer system is asked to perform is very important. The more you want your computer to do, the more processing power it needs, regardless of the operating system. As you use and make the most of OS/2, keep in mind what work you are trying to do, and how you are trying to do it.

## Day-to-Day Usage Considerations

Some of the more obvious impacts on user performance are:

- Number of active applications
- Types of active applications

There are also less obvious impacts on performance, some of which are:

- Number of icons on the desktop
- Number of open folders
- Number of active bitmaps



It is important to think about what OS/2 is doing in the background to accomplish all the tasks you want to do, and to maintain the look and feel you want. It is great to have an object-oriented user interface for look and feel, ease of use, and other advantages. However, the drawback of object-oriented interfaces is the resources required to process all the objects and object-related information such as folder size, position, color, and content. As a folder is opened, the amount of memory needed to process the information increases, and places a burden on other applications or tasks that are all competing for memory and processor resources.

**Folder Considerations:** It is helpful to close folders and applications that are not in use. We also suggest minimizing unused folders to improve responsiveness. Each folder requires some memory to maintain information about the folder, such as folder icon, folder type, and other things. The same holds true for objects within folders.

When a folder is opened, the operating system queries the file system (using DOSFindFirst and DOSFindNext) to determine what the folder's objects are, and any attribute information that accompanies each object. Although many users wait until the folder is completely populated, you can start to work with the objects as soon as they appear in the folder. As more and more objects are added to a folder, the time to populate the folder with the objects increases. It is recommended that you keep the number of objects in any folder to 40 or fewer.

Another small factor that affects folder population is related to the icons associated with program refer-

ences. If the icon for a program is part of the extended attribute information, rather than part of the executable (.EXE), the icon appears faster. This is due to the additional query time for searching the executable compared to searching an extended attribute list.

**Desktop Considerations:** Creating a folder with a shadow of commonly referenced desktop objects may increase your productivity. When multiple windows are active on the desktop (applications or folders), it becomes increasingly difficult to navigate the Workplace Shell. By creating a folder with shadows of commonly referenced objects, it is easier to access the objects. You can keep the folder minimized, and resurface it very quickly by using the Window List.

An alternative to creating a folder with shadows in it is to modify the desktop settings so that you can actually have multiple views of the desktop open at once. By changing the "Object open behavior" from "Display existing window" to "Create new window", you can open multiple desktops. This may come in handy if the desktop is becoming cluttered and you need to access a printer object. With the above settings in place, you could bring up the desktop pop-up menu, and select Open and your choice of Icon view, Tree view, or Details view. This opens a folder with the view of your choice and give you quick access to your objects.

Selecting Arrange in this new window also causes the desktop to arrange its objects. However, if the shadow technique is used, an Arrange affects only the contents of the new folder with the shadow objects in it.

## Menu Options and

**Considerations:** One option in the pop-up menu for an object is "Create another". If you want to create a new folder, it is usually faster to select the "Create another" menu option rather than opening the Templates folder, finding the Folder template, and dragging off a copy.

Other menu options that may aid in productivity are related to adding menu options to the pop-up menu. It is possible to add menu options to the pop-up menus of the Workplace Shell. This may be useful for providing quick access to your favorite application. Use the following steps if you want to add an application to the desktop pop-up menu.

1. Open the Settings Notebook for the Desktop.
2. Select the Menu tab.
3. With the "Primary pop-up menu" highlighted in the "Available menus:" listbox, press the "Create another..." button next to the "Actions on menu:" listbox (in the lower part of the Settings page).
4. Enter your application's name as you want it to appear on the pop-up menu in the "Menu item name:" entry field.
5. Enter the physical path and name of the program in the "Name:" field of the Program dialog area. (Optionally, you can use the "Find program..." button to search for the program if the path is not known.)
6. Select OK and verify that your entry appears in the "Actions on menu:" listbox.
7. Close the Settings notebook.



8. Bring up the pop-up menu for the desktop, and select your new menu option to load your application.

### Startup Folder Considerations:

Another way to increase your productivity is through the use of the Startup folder. Applications, folders, and objects that you want to start automatically should be placed in the Startup folder, which is located in the OS/2 System folder. This is very similar to activities in your own office: The most recent projects you worked on are put in the top shelf of the file drawer. When you arrive the next day, the first things you pull out are the top items in the file drawer.

The objects in the Startup folder start in a random order. If it is necessary to start certain applications in a sequence, there are other ways to achieve this. One way is to order the applications in a STARTUP.CMD file. Another way is to include RUN or CALL statements in the CONFIG.SYS file.

**Object Associations:** An easy way to customize the Workplace Shell is to make use of associations. This refers to linking applications and data objects by particular attributes, such as types or extensions. An example of this is to be able to double-click a data object with an .XYZ file extension, and have it automatically start and load the file into the PMChart application. To accomplish this scenario, follow these steps:

1. Bring up the Settings notebook for the application for which you want to associate a data object (PMChart in this example).
2. Select the Association tab of the Settings notebook.

3. Type \*.XYZ in the "New name:" field and select "Add >".

4. Your file extension should be displayed in the "Current names" listbox.

5. Close the Settings notebook.

6. Double-click on an object with the .XYZ extension, and watch the PMChart application load.

**General Considerations:** If you like to explore the settings of the various objects and of the system, be sure that you know what you are doing – it is very easy to make changes but not remember how to recover in the event of a failure. Changing statements in the CONFIG.SYS file should be left to an administrator or technical person. Changing some of the settings for an application can be performed with less expertise. Some items you may want to experiment with are:

- Full-screen versus windowed applications
- Display existing window versus create new window
- Creating customized templates
- Creating shadows

The first two items in this list can be accessed by the Settings notebook for a particular application. Select the Session tab or the Window tab, respectively. Using and modifying templates can be done through the Templates folder on the default Workplace Shell desktop. Before modifying the default templates, create copies, then modify the copies. This ensures that you can recover from errors by starting at the beginning. A shadow of an object can be created by holding the Ctrl+Shift keys simultaneously while dragging an object to a new location. Further

information about these topics can be found in the Master Help Index and the README file.

Since most users have several objects open at any given time, it is helpful to use the minimize button and the Window List to ease navigation through the Workplace Shell and active applications and folders. Keeping applications and folders minimized makes finding desktop objects easier, and also reduces the amount of processing that OS/2 must do when applications are open on the desktop.

## How to Check Which Version of OS/2 2.x Is Installed

Because several versions and releases of OS/2 2.x are available, it is useful to be able to check which one is installed.

To do this, we recommend using the SYSLEVEL command from an OS/2 command prompt in either a windowed or full-screen OS/2 session.

The output from SYSLEVEL is in line-mode, and is displayed one page at a time. SYSLEVEL reports on all the OS/2 system components installed on all the disks in your system. You should look for two specific pieces of information: the OS/2 Base Operating System level, and the OS/2 Graphics Engine level.

If more than one version of OS/2 is installed on your computer system, this information is reported for each version. In this case, look for the information for the disk from which you booted OS/2.



Non-US systems have a country letter as the third character of the CSD level; for example, the UK CSD level for OS/2 2.0 is XRU2000.

Figures 17 through 20 show SYSLEVEL output for OS/2 2.0, OS/2 2.00.1, OS/2 2.0 with Service Pak XR06055 applied, and OS/2 2.1, respectively.

Abbreviations associated with IBM Operating System/2\* are listed on the last page of this article.

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```
C:\OS2\INSTALL\SYSLEVEL.OS2
IBM OS/2 Base Operating System
Version 2.00      Component ID 562107701
Type 0
Current CSD level: XR02000
Prior CSD level:  XR00000

C:\OS2\INSTALL\SYSLEVEL.GRE
IBM OS/2 16-bit Graphics Engine
Version 2.00      Component ID 562107701
Type 0
Current CSD level: XR02000
Prior CSD level: XR00000
```

**Figure 17. SYSLEVEL Output: OS/2 2.0**

```
C:\OS2\INSTALL\SYSLEVEL.OS2
IBM OS/2 Base Operating System
Version 2.00      Component ID 562107701
Type 0
Current CSD level: XR06055
Prior CSD level:  XR02000

C:\OS2\INSTALL\SYSLEVEL.GRE
IBM OS/2 32-bit Graphics Engine
Version 2.01.1    Component ID 562107701
Type 0
Current CSD level: XR02010
Prior CSD level:  XR02000
```

**Figure 19. SYSLEVEL Output: OS/2 2.0 with Service Pak XR06055 Applied**

```
C:\OS2\INSTALL\SYSLEVEL.OS2
IBM OS/2 Base Operating System
Version 2.00.1    Component ID 562107701
Type 0
Current CSD level: XR02010
Prior CSD level:  XR02000

C:\OS2\INSTALL\SYSLEVEL.GRE
IBM OS/2 32-bit Graphics Engine
Version 2.01.1    Component ID 562107701
Type 0
Current CSD level: XR02010
Prior CSD level:  XR02000
```

**Figure 18. SYSLEVEL Output: OS/2 2.00.1**

```
C:\OS2\INSTALL\SYSLEVEL.OS2
IBM OS/2 Base Operating System
Version 2.10      Component ID 562107701
Type 0
Current CSD level: XR02010
Prior CSD level:  XR02010

C:\OS2\INSTALL\SYSLEVEL.GRE
IBM OS/2 32-bit Graphics Engine
Version 2.10      Component ID 562107701
Type 0
Current CSD level: XR02010
Prior CSD level:  XR02010
```

**Figure 20. SYSLEVEL Output: OS/2 2.1**



## List of OS/2 2.X Abbreviations

<b>ABIOS</b>	Advanced BIOS	<b>LCD</b>	Liquid-Crystal Display
<b>ACL</b>	Access Control List	<b>LDT</b>	Local Descriptor Table
<b>API</b>	Application Programming Interface	<b>MAVDM</b>	Multiple Application Virtual DOS Machine
<b>APM</b>	Advanced Power Management	<b>MB</b>	Megabyte (1,048,576 bytes)
<b>ATM</b>	Adobe Type Manager	<b>MCI</b>	Media Control Interface
<b>BIOS</b>	Basic Input/Output System	<b>MHz</b>	Megahertz
<b>CD-DA</b>	Compact Disk - Digital Audio	<b>MIDI</b>	Musical Instrument Digital Interface
<b>CD-ROM</b>	Compact Disk - Read-Only Memory	<b>MMIO</b>	Multimedia I/O Services
<b>CD-ROM/XA</b>	Compact Disk - Read-Only Memory / Extended Architecture	<b>MMPM/2</b>	Multimedia Presentation Manager/2
<b>CGA</b>	Color/Graphics Adapter	<b>MRI</b>	Machine-Readable Instruction
<b>DASD</b>	Direct Access Storage Device	<b>MSCDEX</b>	Microsoft CD Extensions
<b>DBCS</b>	Double-Byte Character Set	<b>MVDM</b>	Multiple Virtual DOS Machines
<b>DDE</b>	Dynamic Data Exchange	<b>NLS</b>	National Language Support
<b>DEM</b>	DOS Emulation	<b>OLE</b>	Object Linking and Embedding
<b>DLL</b>	Dynamic Link Library	<b>PCMCIA</b>	Personal Computer Memory Card International Association
<b>DMA</b>	Direct Memory Access	<b>PDD</b>	Physical Device Driver
<b>DOS</b>	Disk Operating System	<b>PEL</b>	Picture Element
<b>DPMI</b>	DOS Protected-Mode Interface	<b>PM</b>	Presentation Manager
<b>DMQS</b>	Display Mode Query and Set	<b>PMDD</b>	Presentation Manager Device Driver
<b>DRAM</b>	Dynamic Random-Access Memory	<b>PS/VP</b>	PS/ValuePoint
<b>EA</b>	Extended Attribute	<b>RAM</b>	Random-Access Memory
<b>EGA</b>	Enhanced Graphics Adapter	<b>RIPL</b>	Remote Initial Program Load
<b>EMS</b>	Extended Memory Support	<b>ROM</b>	Read-Only Memory
<b>EPM</b>	Enhanced Editor	<b>SAVDM</b>	Single Application Virtual DOS Machine
<b>ESDI</b>	Enhanced Small Device Interface	<b>SBCS</b>	Single-Byte Character Set
<b>FAT</b>	File Allocation Table	<b>SCSI</b>	Small Computer System Interface
<b>GA</b>	General Availability	<b>SIMM</b>	Single Inline Memory Module
<b>GB</b>	Gigabyte (1,073,741,824 bytes)	<b>SOM</b>	System Object Model
<b>GDT</b>	Global Descriptor Table	<b>SPI</b>	Stream Programming Interface
<b>GUI</b>	Graphical User Interface	<b>SVGA</b>	Super Video Graphics Array
<b>HPFS</b>	High-Performance File System	<b>VCDROM</b>	Virtual CD-ROM Driver
<b>IDE</b>	Intelligent Drive Electronics	<b>VDD</b>	Virtual Device Driver
<b>IME</b>	Input Method Editor	<b>VDM</b>	Virtual DOS Machine
<b>IPC</b>	Interprocess Communication	<b>VGA</b>	Video Graphics Array
<b>IPF</b>	Information Presentation Facility	<b>VIO</b>	Video Input/Output
<b>ISA</b>	Industry-Standard Architecture	<b>VPIC</b>	Virtual Programmable Interrupt Controller
<b>ISO</b>	International Standards Organization	<b>VRAM</b>	Video Random-Access Memory
<b>ITSC</b>	(IBM) International Technical Support Center	<b>VxD</b>	Virtual Device Driver (in Windows 3.1 Enhanced Mode)
<b>KB</b>	Kilobyte (1,024 bytes)	<b>XGA</b>	Extended Graphics Array
<b>LAN</b>	Local-Area Network	<b>XMS</b>	Extended Memory Support



# Conserving Disk Space in OS/2 2.1

*The material in this article is excerpted from OS/2 2.1 Performance Tuning for End Users, produced by Ginny Roarabaugh, IBM Personal Software Products Development Laboratory, Boca Raton, Florida.*

If you find that your computer's disk space is at a premium, you may want to remove some previously installed features of OS/2 2.1. The first half of this article lists the files for some features and applets in OS/2 2.1 that you may want to delete from your OS/2 2.1 disk partition.

The second half of the article gives information on which files are required on a LAN requester machine, and which can be migrated to a LAN server machine.

Pay careful attention to which files can be deleted, which can be moved, and which should never be moved or deleted.

Files listed are sorted first by extension (.XXX), then by name.

## OS/2 Files that Can be Deleted

### Advanced Power Management (APM)

APM is used to conserve power in battery-powered computer systems, usually notebook-type computers. To delete APM, delete the file  
`\OS2\APM.SYS`

In the rest of the lists on these first two pages, keep in mind that the listed files can be deleted.

### Bitmaps

Extra bitmaps are provided for background display. They are in the `\OS2\BITMAP` subdirectory. All bitmaps except one – `OS2LOGO.BMP` – can be deleted.

### CID

These files are used for LAN installation of OS/2.

`\OS2\INSTALL\SEDISK.EXE`  
`\OS2\INSTALL\SEIMAGE.EXE`  
`\OS2\INSTALL\SEINST.EXE`  
`\OS2\INSTALL\SEMAINT.EXE`

### Command Reference

This file, the system command reference, is the on-line help.

`\OS2\BOOK\CMDREF.INF`

### High-Performance File System (HPFS)

`\OS2\CACHE.EXE`  
`\OS2\HPFS.IFS`  
`\OS2\DLL\STARTLW.DLL`  
`\OS2\DLL\UHPFS.DLL`

### Linker

Application developers use the linker files to link compiled or assembled files into programs. Users who are not developing applications may want to delete these files.

`\OS2\RCPP.ERR`  
`\OS2\LINK.EXE`  
`\OS2\LINK386.EXE`  
`\OS2\RC.EXE`  
`\OS2\RCPP.EXE`

### PCMCIA Support

`\OS2\PCMCIA.SYS`

### REXX

REXX is a simplified programming language. Users who do not need REXX can delete these files.

`\OS2\REXXTRY.CMD`  
`\OS2\PMREXX.EXE`  
`\OS2\RXQUEUE.EXE`  
`\OS2\RXSUBCOM.EXE`  
`\OS2\REX.MSG`  
`\OS2\REXH.MSG`  
`\OS2\BOOK\REXX.INF`

`\OS2\DLL\PMREXX.DLL`  
`\OS2\DLL\REXX.DLL`  
`\OS2\DLL\REXXAPI.DLL`  
`\OS2\DLL\REXXINIT.DLL`  
`\OS2\DLL\REXXUTIL.DLL`  
`\OS2\HELP\PMREXX.HELP`

### Remote Initial Program Load (RIPL)

`\OS2\HELP\RIPLINST.HLP`  
`\OS2\INSTALL\RIPLINST.EXE`

### OS/2 Tutorial

`\OS2\TUTORIAL.EXE`  
`\OS2\DLL\TUTORIAL.DLL`  
`\OS2\HELP\TUTORIAL.HLP`

### Chess applet

`\OS2\APPS\OS2CHESS.BIN`  
`\OS2\APPS\OS2CHESS.EXE`  
`\OS2\APPS\DLL\CHESSAI.DLL`  
`\OS2\APPS\HELP\OS2CHESS.HLP`

### EPM, the Enhanced Editor applet

`\OS2\APPS\BOX.EX`  
`\OS2\APPS\DRAW.EX`  
`\OS2\APPS\E3EMUL.EX`  
`\OS2\APPS\EPM.EX`  
`\OS2\APPS\EPMLEX.EX`  
`\OS2\APPS\EXTRA.EX`  
`\OS2\APPS\GET.EX`  
`\OS2\APPS\HELP.EX`  
`\OS2\APPS\MATHLIB.EX`  
`\OS2\APPS\PUT.EX`  
`\OS2\APPS\EPM.EXE`  
`\OS2\APPS\DLL\ETKE551.DLL`  
`\OS2\APPS\DLL\ETKR551.DLL`  
`\OS2\APPS\DLL\ETKTHNK.DLL`  
`\OS2\HELP\EPM.HLP`  
`\OS2\HELP\EPMHELP.QHL`

### Jigsaw applet

`\OS2\APPS\JIGSAW.EXE`  
`\OS2\HELP\JIGSAW.HLP`

### Klondike (solitaire) applet

`\OS2\APPS\CARDSYM.FON`  
`\OS2\APPS\KLONDIKE.EXE`  
`\OS2\DLL\KLONBGA.DLL`  
`\OS2\HELP\KLONDIKE.HLP`

### Neko (the cat) applet

`\OS2\APPS\NEKO.EXE`  
`\OS2\DLL\NEKO.DLL`  
`\OS2\HELP\NEKO.HLP`



**PicView**

\OS2\APPS\PICVIEW.EXE  
 \OS2\APPS\DLL\PICVIEW.DLL  
 \OS2\HELP\PICVIEW.HLP

**PMChart productivity aid applet**

\OS2\APPS\FASHION.DAT  
 \OS2\APPS\GREEN.DAT  
 \OS2\APPS\INVEST.DAT  
 \OS2\APPS\PMCHART.EXE  
 \OS2\APPS\FASHION.GRF  
 \OS2\APPS\GREEN.GRF  
 \OS2\APPS\INVEST.GRF  
 \OS2\APPS\DLL\MGXLIB.DLL  
 \OS2\APPS\DLL\MGXVBM.DLL  
 \OS2\APPS\DLL\PMFID.DLL  
 \OS2\APPS\HELP\PMCHART.HLP

**PM Diary productivity aid applet**

\OS2\APPS\PMDALARM.EXE  
 \OS2\APPS\PMDCALC.EXE  
 \OS2\APPS\PMDCALEN.EXE  
 \OS2\APPS\PMDDARC.EXE  
 \OS2\APPS\PMDDIARY.EXE  
 \OS2\APPS\PMDLIST.EXE  
 \OS2\APPS\PMDMONTH.EXE  
 \OS2\APPS\PMDDNOTE.EXE  
 \OS2\APPS\PMDTARC.EXE  
 \OS2\APPS\PMDDTODO.EXE  
 \OS2\APPS\PMDTUNE.EXE  
 \OS2\APPS\PMDBASE.EXE  
 \OS2\APPS\PMSPREAD.EXE  
 \OS2\APPS\PMSTICKY.EXE  
 \OS2\APPS\DLL\PMDIARY.DLL  
 \OS2\APPS\DLL\PMDIARYF.DLL  
 \OS2\APPS\DLL\PMSTICKD.DLL  
 \OS2\HELP\PMDIARY.HLP

**PM Seek productivity aid applet**

\OS2\APPS\PMSEEK.EXE  
 \OS2\DLL\PMSEEK.DLL  
 \OS2\HELP\PMSEEK.HLP

**Pulse (CPU meter) applet**

\OS2\APPS\PULSE.EXE  
 \OS2\HELP\PULSE.HLP

**Reversi game applet**

\OS2\APPS\REVERSI.EXE  
 \OS2\HELP\REVERSI.HLP

**Scramble game applet**

\OS2\APPS\SCRAMBLE.EXE  
 \OS2\DLL\SCRAMBLE.DLL  
 \OS2\DLL\SCRCATS.DLL

\OS2\DLL\SCRLOGO.DLL  
 \OS2\HELP\SCRAMBLE.HLP

**SofTerm (terminal emulator) applet**

\OS2\APPS\ACSACDI.DAT  
 \OS2\APPS\CTLSACDI.EXE  
 \OS2\APPS\SOFTERM.EXE  
 \OS2\APPS\CUSTOM.MDB  
 \OS2\APPS\SASYNCDATA.SYS  
 \OS2\APPS\SASYNCPDB.SYS  
 \OS2\DLL\CTLSACDI.DLL  
 \OS2\DLL\OACDISIO.DLL  
 \OS2\DLL\OANSI.DLL  
 \OS2\DLL\OANSI364.DLL  
 \OS2\DLL\OCHAR.DLL  
 \OS2\DLL\OCM.DLL  
 \OS2\DLL\OCOLOR.DLL  
 \OS2\DLL\OCSHELL.DLL  
 \OS2\DLL\ODBM.DLL  
 \OS2\DLL\OFMTC.DLL  
 \OS2\DLL\OIBM1X.DLL  
 \OS2\DLL\OIBM2X.DLL  
 \OS2\DLL\OKB.DLL  
 \OS2\DLL\OKBC.DLL  
 \OS2\DLL\OKERMIT.DLL  
 \OS2\DLL\OLPTIO.DLL  
 \OS2\DLL\OMCT.DLL  
 \OS2\DLL\OMRKCPY.DLL  
 \OS2\DLL\OPCF.DLL  
 \OS2\DLL\OPM.DLL  
 \OS2\DLL\OPROFILE.DLL  
 \OS2\DLL\ORSHELL.DLL  
 \OS2\DLL\OSCH.DLL  
 \OS2\DLL\OSIO.DLL  
 \OS2\DLL\OSOFT.DLL  
 \OS2\DLL\OTEK.DLL  
 \OS2\DLL\OTTY.DLL  
 \OS2\DLL\OVIO.DLL  
 \OS2\DLL\OVM.DLL  
 \OS2\DLL\OVT.DLL  
 \OS2\DLL\OXMODEM.DLL  
 \OS2\DLL\OXRM.DLL  
 \OS2\DLL\SACDI.DLL  
 \OS2\DLL\SAREXEC.DLL  
 \OS2\DLL\SACDI.MSG  
 \OS2\HELP\ACDISIO.HLP  
 \OS2\HELP\ANSI364.HLP  
 \OS2\HELP\ANSIIBM.HLP  
 \OS2\HELP\IBM31011.HLP  
 \OS2\HELP\IBM31012.HLP  
 \OS2\HELP\IBMSIO.HLP  
 \OS2\HELP\SOFTERM.HLP  
 \OS2\HELP\TTY.HLP  
 \OS2\HELP\VTTERM.HLP  
 \OS2\HELP\XRM.HLP

**FAXPM fax applet**

\OS2\APPS\FAXDDE.EXE  
 \OS2\APPS\FAXPM.EXE  
 \OS2\APPS\FAXVIEW.EXE  
 \OS2\APPS\FAXPM.HLP  
 \OS2\APPS\FAXREQ.HLP  
 \OS2\APPS\FAXFLDR.ICO  
 \OS2\APPS\ACCLASS2.RCV  
 \OS2\APPS\SIMUL.RCV  
 \OS2\APPS\ACCLASS2.SND  
 \OS2\APPS\SIMUL.SND  
 \OS2\APPS\DLL\ACCLASS2.DLL  
 \OS2\APPS\DLL\FAXAPP1.DLL  
 \OS2\APPS\DLL\FAXAPP10.DLL  
 \OS2\APPS\DLL\FAXAPP11.DLL  
 \OS2\APPS\DLL\FAXAPP12.DLL  
 \OS2\APPS\DLL\FAXAPP2.DLL  
 \OS2\APPS\DLL\FAXAPP3.DLL  
 \OS2\APPS\DLL\FAXAPP4.DLL  
 \OS2\APPS\DLL\FAXAPP5.DLL  
 \OS2\APPS\DLL\FAXAPP6.DLL  
 \OS2\APPS\DLL\FAXAPP7.DLL  
 \OS2\APPS\DLL\FAXAPP8.DLL  
 \OS2\APPS\DLL\FAXAPP9.DLL  
 \OS2\APPS\DLL\SIMUL.DLL  
 \OS2\DLL\FAXPM\FAXPM.DRV  
 \OS2\DLL\FAXPM\FAX42XX.EXE  
 \OS2\DLL\FAXPM\PRT32FAX.EXE  
 \OS2\DLL\FAXPM\FAX\_DRV.HLP

**Migrating OS/2 Files to a LAN Server**

This section contains information about which files are required on a LAN requester machine, and which can be migrated to a LAN server machine. To gather this information, the Personal Software Products Development Laboratory performed tests that (1) moved files off of a requester machine onto the server, then (2) booted the requester machine, then (3) performed basic operations, functions, and applications.

*Important:*

(1) When you move files to a server machine, remember to modify the LIBPATH, PATH, and DPATH statements in the requester machine's CONFIG.SYS file to point to the directory on the server where the files were moved to.



(2) You should never delete any OS/2 system directory entries in these path statements, even if those entries are empty. If they are empty, move them to the ends of your path statements.

(3) For applications that appear in folders, you must update their settings to point to the correct drive and directory. Examples of such applications are:

- STHR.EXE, in the Start Here icon on the OS/2 desktop
- E.EXE in the Productivity folder
- All applets and games in the Productivity and Games folders.

#### Files to Remain in \OS2 Directory on LAN Requester

Following is a list of files that should remain in the \OS2 directory on the LAN Requester machine. Most of these files are for device drivers, hardware support, and system and user .INI files. Some of the .SYS and .DMD files may not reside in your \OS2 directory, depending on the type of installation you did, and what hardware is installed in your computer system.

Unlike in the previous section, keep in mind that the files listed here should remain on your LAN Requester system.

IBM2ADSK.ADD  
IBM2FLPY.ADD  
IBM2SCSI.ADD  
000000.BIO  
F80D00.BIO  
F80D01.BIO  
W020100.BIO  
W020101.BIO  
W050000.BIO  
W050100.BIO  
W050101.BIO  
W060100.BIO  
W0F0000.BIO  
CHKDSK.COM  
KEYBOARD.DCP  
VIOTBL.DCP

OS2ASPI.DMD  
OS2DASD.DMD  
OS2SCSI.DMD  
ATTRIB.EXE  
CACHE.EXER  
CMD.EXE  
PMREXX.EXE  
PMSHELL.EXE  
SVGA.EXE  
UNPACK.EXE  
VIEW.EXE  
VIEWDOC.EXE  
HPFS.IFS  
PMCONTRL.INF  
OS2.INI  
OS2SYS.INI  
IBMINT13.I13  
ABIOS.SYS  
CLOCK02.SYS  
COM.SYS  
DOS.SYS  
EXTDSKDD.SYS  
LOG.SYS  
MOUSE.SYS  
KBD02.SYS  
PCLOGIC.SYS  
PCMCIA.SYS  
PMDD.SYS  
POINTDD.SYS  
PRINT02.SYS  
SCREEN02.SYS  
TESTCFG.SYS  
VDISK.SYS

In the list above:

The CACHE.EXE and HPFS.IFS files are required if you are using HPFS in your system.

UNPACK.EXE is included in case you need to retrieve a file from the installation diskettes.

CHKDSK.COM is included if Auto-check is specified for the file systems when the system is booted.

The ATTRIB.EXE file is included because it may be needed by certain support functions.

Files not listed above can be moved to a directory on the server. This directory should be placed in the PATH statement of the CONFIG.SYS file in the root directory of the requester machine. It would also be wise to create a disk-

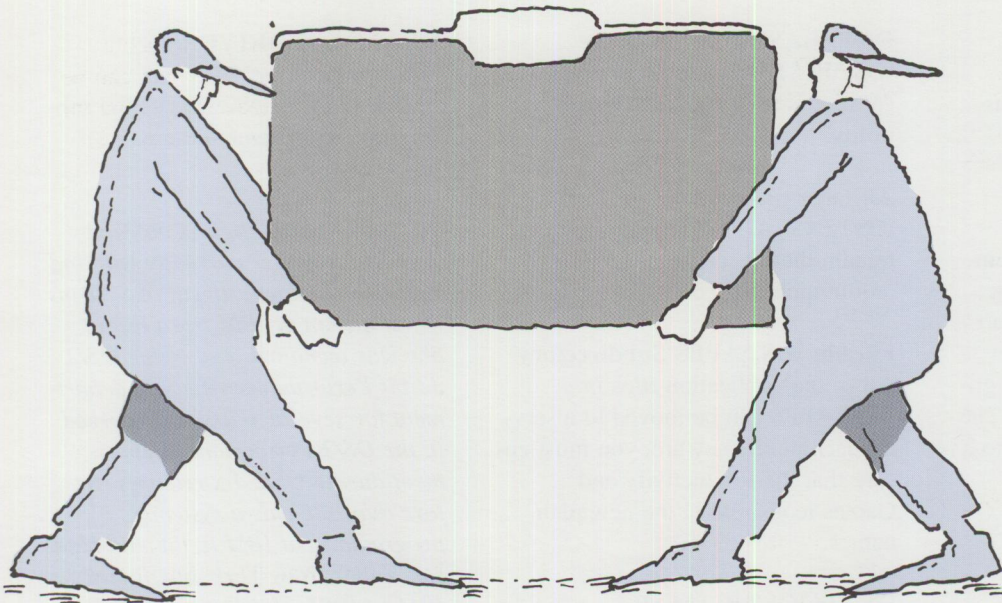
ette with system utilities such as FORMAT and XCOPY that can be kept near the requester machine for maintenance in case the server is not available.

#### Files to Remain in \OS2\DLL Subdirectory

Following is a list of the .DLL files that must remain in the \OS2\DLL subdirectory of the requester machine. This subdirectory also contains files used for fonts and printer drivers; although they are not listed here, these files should remain on your requester machine. Their file extensions are .DRV, .FON, .PDR, .PSF, and .QPR. The following list also does not include any .DLL files that may have been placed in the \OS2\DLL subdirectory by a product other than OS/2.

BKSCALLS.DLL  
BMSCALLS.DLL  
BVH8514A.DLL  
BVHVGA.DLL  
BVHWNDW.DLL  
BVSCALLS.DLL  
DISPLAY.DLL  
DOSCALL1.DLL  
FKA.DLL  
HELPMGR.DLL  
HPMGRMR1.DLL  
IBM8514.DLL  
IMP.DLL  
KBDCALLS.DLL  
MINXMR1.DLL  
MOUCALLS.DLL  
MSG.DLL  
NAMPIPES.DLL  
NLS.DLL  
NPXEMLTR.DLL  
NWIAPI.DLL  
OS2CHAR.DLL  
OS2SM.DLL  
PMATM.DLL  
PMCTLS.DLL  
PMDRAG.DLL  
PMGPI.DLL  
PMGRE.DLL  
PMMLE.DLL  
PMSDMR1.DLL  
PMSHAPI.DLL  
PMSHAPIM.DLL  
PMSHLTKT.DLL





PMSPL.DLL  
PMVIOP.DLL  
PMWIN.DLL  
PMWP.DLL  
PMWPMR1.DLL  
QUECALLS.DLL  
REXXINIT.DLL  
SESMGR.DLL  
SOM.DLL  
SPLIB.DLL  
VIOCALLS.DLL  
WCFGMRI.DLL  
WINCFG.DLL  
WPCONFIG.DLL  
WPCONMR1.DLL  
WPPRINT.DLL  
WPPRTMR1.DLL

Files not listed above can be moved to a directory on the server.

The actual BVH\*.DLL and IBM\*.DLL files you have may vary, depending on the type of display adapter that is in your computer system. In any case, if the name of a .DLL file starts with BVH or IBM, it must remain in the \OS2\DLL subdirectory on the requester machine.

### Files to Remain in \OS2\MDOS Subdirectory

Following is a list of the files that must remain in the \OS2\MDOS subdirectory of the requester machine. The APPEND.EXE file must never be moved from this subdirectory. The DOSKRNL and COMMAND.COM files are specifically searched for in this subdirectory. All the other listed files provide device-driver support. They can be removed if the devices are not on your system, or they may not appear due to the installation options that were used.

DOSKRNL  
COMMAND.COM  
APPEND.EXE  
ANSI.SYS  
COMDD.SYS  
EGA.SYS  
EMM386.SYS  
FSFILTER.SYS  
HIMEM.SYS  
LPTDD.SYS  
V8514A.SYS  
VAPM.SYS  
VBIOS.SYS  
VCDROM.SYS  
VCGA.SYS  
VCMOS.SYS

VCOM.SYS  
VDMA.SYS  
VDPMI.SYS  
VDPX.SYS  
VDSK.SYS  
VEGA.SYS  
VEMM.SYS  
VFLPY.SYS  
VKBD.SYS  
VLPT.SYS  
VMONO.SYS  
VMOUSE.SYS  
VNPX.SYS  
VPCMCIA.SYS  
VPIC.SYS  
VSVGA.SYS  
VTIMER.SYS  
VVGA.SYS  
VWIN.SYS  
VXGA.SYS  
VXMS.SYS

### Files in \OS2\BOOK and \OS2\HELP Subdirectories

All of the base OS/2 files in the \OS2\BOOK and \OS2\HELP subdirectories can be moved to a server machine. If they are moved, the SET HELP, SET GLOSSARY, and SET BOOKSHELF statements in CONFIG.SYS on the requester machine must be modified to point to the server path.



### Files in \OS2\SYSTEM Subdirectory

No files should be removed from this subdirectory.

### Files in \OS2\INSTALL Subdirectory

Which files may be removed from the \OS2\INSTALL subdirectory will depend on what other support is being installed on your system and whether service updates are going to be applied to the system. The following files can be migrated to a LAN server machine:

DATABASE.DAT  
DATABASE.TXT  
INSTAID.LIB  
PRDESC.LST  
PRDRV.LST  
SAMPLE.RSP  
USER.RSP

Although these files can be moved, you may want to keep the

DATABASE.DAT file in the \OS2\INSTALL subdirectory, because it is used by the Migrate utility.

All other files in the \OS2\INSTALL subdirectory must remain there because of service requirements.

### Files in \OS2\APPS Subdirectory

All of the application files in \OS2\APPS can be moved to a server machine. If they are, you must ensure that the Productivity and Games icons reflect the new path names.

### Files in \OS2\BITMAP Subdirectory

In the \OS2\BITMAP subdirectory, the only file that must remain is OS2LOGO.BMP.

### Files in \OS2\DRIVERS Subdirectory

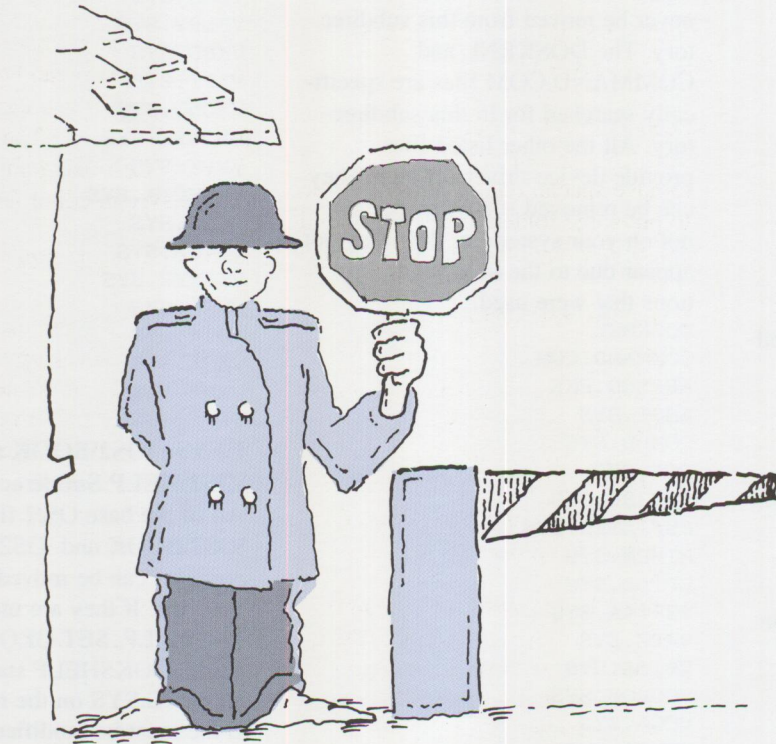
All files in the \OS2\DRIVERS subdirectory must remain there.

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# Customizing Your Application Migration

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The OS/2 operating system, version 2.1, offers support for DOS and DOS/Windows applications, as well as OS/2 and Presentation Manager applications. This means you can install many different application types, and work with them concurrently in one system.

To make it easy to set up your applications where you want them, and to provide a quick way to create program icons, the Migrate utility is provided with OS/2 2.x.

## What is Migrate?

The Migrate utility locates program files, creates program icons, and sets paths and some specific settings. The Migrate utility either accesses information in a migration database file (DATABASE.DAT), or uses standard defaults. Many settings have standard defaults, too numerous to discuss here. This article concentrates on the DATABASE.DAT file.

The Migrate utility runs at the end of OS/2 installation. It also runs at the end of any subsequent selective installation of OS/2 features. Finally, you can run the Migrate utility at any time by selecting its program object.

## Why Create a Customized Migration Database?

The DATABASE.DAT migration database supplied with OS/2 2.1 contains information about more than 600 applications.

But, suppose you install OS/2 on many systems. If you would like to configure programs and create program objects automatically – putting the icons on the desktop or in specific folders – then a customized migration database is for you. You can create your own customized migration database easily. Then, instead of moving program icons to different folders and changing settings program-by-program, you can let the Migrate utility do the work.

First, decide for which programs you would like to have icons somewhere on the desktop. These can be programs you have installed, or programs (utilities or applets) that come with OS/2. Program files have file extensions of .EXE, .COM, .BAT, or .CMD.

Second, decide about your folder setup. For instance, you can decide to have special names on folders, or to put some folders inside other folders, or use any other decision factor.

## Customized Migration Database File

Once you have decided about your icons and desktop folder layout, you can create a customized migration database file. In this article, your customized migration database file is named MYDB.DAT.

### Default Input and Output Files:

The file DATABASE.TXT is the input file, in text format, containing information that was used to compile the supplied DATABASE.DAT file. The file DATABASE.DAT is

the default migration database file that the Migrate utility can use unless you tell it otherwise. These two DATABASE files are located in the \OS2\INSTALL subdirectory.

Your goal is to create customized files, MYDB.TXT and MYDB.DAT, that the Migrate utility will use to migrate your list of programs to the OS/2 2.1 environment.

**Creating MYDB.TXT:** Before you can create your customized migration database file, MYDB.DAT, you must first create your corresponding customized text input file, MYDB.TXT. (You could, of course, alter your original DATABASE.TXT file, but if you inadvertently make mistakes in your alteration, you will no longer have a good original file.)

As a starting point, make a copy of the DATABASE.TXT file, and call the copied file MYDB.TXT. It does not matter where you put MYDB.TXT; it can even be put on a diskette so that it can be shared or moved easily. Then edit MYDB.TXT using any editor, such as the system editor (EPM).

In DATABASE.TXT, find a program entry to use as a template for creating your own program entry in MYDB.TXT. Copy all the lines from the template entry in DATABASE.TXT to MYDB.TXT. Change the names and paths in MYDB.TXT where appropriate. Then change or enter the specific settings information. For example, you may have tried a specific setting for your environment and found it to be useful.

All tokens and settings that apply to one program must be placed together in MYDB.TXT, with no



```

REM -----
REM My Utilities -- FDISKPM
REM -----
NAME          FDISKPM.EXE
TITLE         FDISKPM
TYPE          OS/2
ASSOC_FILE    NULL
DEF_DIR       NULL
FOLDER        My Utilities
(here you must have a blank line)

```

Figure 1. MYDB.TXT Entry for Placing FDISKPM.EXE in "My Utilities" Folder

blank lines in between. (A blank line denotes the end of the entry for a program.) The contents within .TXT files are not case-sensitive.

The minimum required tokens for defining a program in your customized migration database file are Name, Title, Type, Assoc\_file and Def\_dir. The Name is the full name of the program to be migrated. The Title is the name that will be displayed under the program object; you can display any title you choose by typing it into the Title field. The Type (OS/2, DOS, or Windows) is used by Migrate to differentiate between multiple versions of the same program. The Assoc\_file and Def\_dir tokens can be entered as Null, or you can specify the associated file type and default directory needed by a specific program.

Additional tokens or settings should be listed next. Finally, as mentioned above, the end of a program's entry must be followed by a blank line.

Figure 1 shows an entry you can make in MYDB.TXT for the program FDISKPM. It includes only the required tokens, plus a Folder token that tells Migrate to put the program object for FDISKPM into the folder titled My Utilities.

**The DBTAGS.DAT File:** This file contains information about all possible tokens and settings for describ-

ing a program in the migration database file. The tags file also contains usage information for each entry. Use the tags file for reference only; do not change this file.

After you complete building your customized text file, MYDB.TXT, save it. Now it is time to compile MYDB.TXT into your customized migration database file MYDB.DAT, using the PARSEDB.EXE program.

**The PARSEDB Utility:** The PARSEDB utility reads an input file (here, MYDB.TXT), verifies that its entries meet the requirements specified in the tags file DBTAGS.DAT, then creates an output file (here, MYDB.DAT). The output file is in a format that the Migrate utility can use to update the program object entries. A program object entry for a particular application is found in the application's Settings notebook.

To specify your customized text file MYDB.TXT as input, and to create your customized migration database file MYDB.DAT as output, use this PARSEDB command:

```

PARSEDB
[path]DBTAGS.DAT
[path]MYDB.TXT
[path]MYDB.DAT

```

Remember to fully qualify the paths for files that are not in your current directory.

As the PARSEDB program runs, it displays the line number that is processing. If an error occurs, the line number of the error is displayed, and the program exits. Examples of errors are: forgetting to put REM on comment lines; specifying unallowable values for settings (e.g., making the DPMI\_MEMORY\_LIMIT entry greater than 512); using invalid keywords; or making errors such as misspelling a setting keyword.

Edit the file MYDB.TXT, correct the error, and begin the PARSEDB process again. At completion, PARSEDB gives a count of programs compiled, and a breakdown of DOS, Windows, and OS/2 applications. When the PARSEDB program has successfully completed, it has compiled your MYDB.DAT file. This file can be used when you run the Migrate utility, next.

**Using Migrate:** To tell the Migrate utility to access your customized database file MYDB.DAT, start the Migrate utility. Change the name of the database file listed at the top of the first dialog menu displayed, so that it points to MYDB.DAT. Then proceed through Migrate. Migrate will access your MYDB.DAT to get specific program information, and will migrate the programs listed in your MYDB.DAT file.

After Migrate ends, you can verify that your program objects have your specific setting values by looking in the settings notebooks of your program objects. Your program objects are located in the folders you specified in your migration database file.

This is an easy way to customize your OS/2 2.1 system and shorten startup time after installation.

*The biography for Virginia Roarbaugh is on page 32.*



## OS/2 2.1 Swap File

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So you have installed the OS/2 operating system, and now you have a swap file, SWAPPER.DAT. Even though you may have large amounts of memory – larger than you probably need – there is still that swap file, staying right there on your hard drive. Perhaps you think you have no control over its size or location. Actually, you do: some CONFIG.SYS parameters provide some user control.

This article covers the swap file's setup parameters, explains how to tune those settings, and gives you the rationale behind the swap file's contents.

Swap files are common in many operating systems, including OS/2. Current computer hardware allows operating systems to assign virtual address space to applications. This address space can be backed by either real (system) memory or by disk space. When more memory is needed to execute programs than is currently available in the computer system, OS/2 moves some of the information stored in memory off to the hard drive, into the SWAPPER.DAT file. This transfer of information is called swapping or paging.

### Swap File Location

The swap file is really just another file on your system. Like all other files, it is managed by the file system, which can be either the File Allocation Table (FAT) system or the



### High-Performance File System (HPFS).

The swap file is allocated at boot time, to improve performance and to reduce fragmentation of this file on the disk. Every time the system is booted (either at power-on or re-boot), the swap file is reallocated as a new file. Because of the behavior of the file systems, the new swap file usually begins in the same location where the last swap file was located. However, users can specify the location and initial size of the swap file, as well as some behavior characteristics.

### Changing the Location and Size of the Swap File

The swap file parameters in OS/2 2.1 have changed from prior releases of OS/2. The new parameters enable easier tuning for increased performance.

For best performance, you should place your swap file in the least-used partition, near the center of

your disk, on either the most frequently accessed non-SCSI disk, or the least frequently accessed SCSI disk. To get to the center of your disk, use FDISK to select a disk partition near the middle. Placing the swap file on the least-used partition reduces fragmentation when the swap file gets larger. Placing the swap file near the center of the disk, especially on an overcommitted system (explained below), minimizes head movement. When there are multiple hard disks, such as busmastering SCSI hard disks, that can overlap I/O requests, put the swap file on the least accessed disk, so that paging requests do not compete with disk access requests by applications. However, if the hard disks cannot overlap I/O requests, keep the swap file on the most frequently accessed disk.

The subject of file system performance is worthy of an article of its own, which may follow in a future issue of this publication.



The swap file's location is determined by the SWAPPATH= line in CONFIG.SYS. Here is a typical SWAPPATH= statement:

```
SWAPPATH=D:\OS2\SYSTEM
4096 3072
```

This SWAPPATH= statement says that the swap file is located in the default \OS2\SYSTEM subdirectory on the install partition, D:. The first parameter, 4096, specifies the minfree value (explained in the next section), and the second parameter, 3072, is the initial swap file size value. Both values are expressed in KB. If the value entered is not precisely a megabyte, OS/2 rounds the value up to the next megabyte value.

Your OS/2 2.1 operating system comes with default values that work well on most computer systems. However, you can tune these values to improve system performance, and to better handle a shortage of disk space on your computer.

### The Minfree Value

In the default configuration of OS/2 2.1, even though an application's request for memory allocation appears to be fulfilled (because of a successful return code RC=0), at that time OS/2 treats that memory as virtual; that is, OS/2 does not yet back that memory request with real memory. It is only when the application wants to use that virtual memory that OS/2 attempts to back it with real memory. However, at that instant the computer system's real memory may be overcommitted; that is, you may be running programs whose working set (the sum of all memory needed for all program code and data) is larger than the amount of real memory in your computer system. In this case, OS/2 probably has to move some data to the swap file, and the swap file

grows. Sometimes, however, OS/2 can discard code instead, freeing up memory without having to write to the swap file.

The swap file's minfree value acts as a warning buffer. Just before OS/2 extends the swap file, it checks to see if there is more free disk space available than the sum of the minfree amount plus the space needed to extend the swap file. If the amount of free disk space is less than the minfree value, you will see a warning message telling you to take immediate action to free up some memory or risk losing data. How you should respond to this message is spelled out later, in the section titled "Reacting to the Minfree Warning."

**The MEMMAN Statement:** The MEMMAN statement has a new parameter that changes the meaning of the minfree value. The default is two parameters:

```
MEMMAN=SWAP, PROTECT
```

Here, the first parameter (SWAP) specifies that the OS/2 operating system should run with swapping enabled. (NOSWAP would mean that all code and data needs to reside in memory until freed.) The second parameter allows applications to run in protected mode.

If the MEMMAN= statement in CONFIG.SYS has the additional parameter COMMIT, like this:

```
MEMMAN=SWAP, PROTECT, COMMIT
```

then OS/2 2.1 will manage memory as it did in OS/2 1.x. In OS/2 1.x, when a memory allocation is requested, either real (system) memory or swap-file space is immediately assigned to satisfy the request. Therefore, in OS/2 2.1, when the

COMMIT parameter is used, OS/2 backs all memory requests immediately, which may cause the swap file to grow.

When an application requests memory, a return code of 8 (memory not available) is sent to the requesting application. The application that receives the RC=8 must be able to handle it, and to exit the memory request successfully. Most applications correctly handle such a failure.

The COMMIT parameter should be used on all unattended computer systems. Servers, especially locked-up servers, should have the COMMIT parameter set.

### Initial Swap File Size

The initial swap file size is set, at installation time, to a default value that depends on the amount of physical memory installed in the computer system. While the default value is generally sufficient, it can be tuned to your specific system.

The swap file's initial size should be set to the value that is most commonly used in your computer system. This helps prevent the overhead of growing the swap file incrementally during paging operations, and having to manage that grown space until files are compacted.

To determine the correct size for your swap file, use your system as you usually do, occasionally checking the size of the SWAPPER.DAT file. The size specified in CONFIG.SYS should be at least this size, or 1 or 2 MB larger if disk space permits.

While the system is running, if more swap file space is needed than is already allocated, the OS/2 kernel will expand the swap file in 1 MB



increments. The swap file expands only during the processing of page faults, when it is determined that more swap space is needed. When one or more pages need to be swapped out from memory, the kernel determines if these particular pages already have space allocated in the swap file. If so, the memory manager simply writes the pages into their allocated swap space. However, if no space is allocated, the memory manager looks for free space within the swap file. If no free space is left, the swap file is expanded, and the memory manager then writes the pages to their new swap space, at the end of the swap file.

Conversely, swap space in the swap file is normally not freed up until the corresponding memory is deallocated (freed). When the swap file grows beyond its initial size, OS/2 must continually determine whether compaction of the swap file can

take place. This additional overhead causes a small performance penalty. To optimize your system's performance, make sure your initial swap file size is correct.

### Swap File Contents

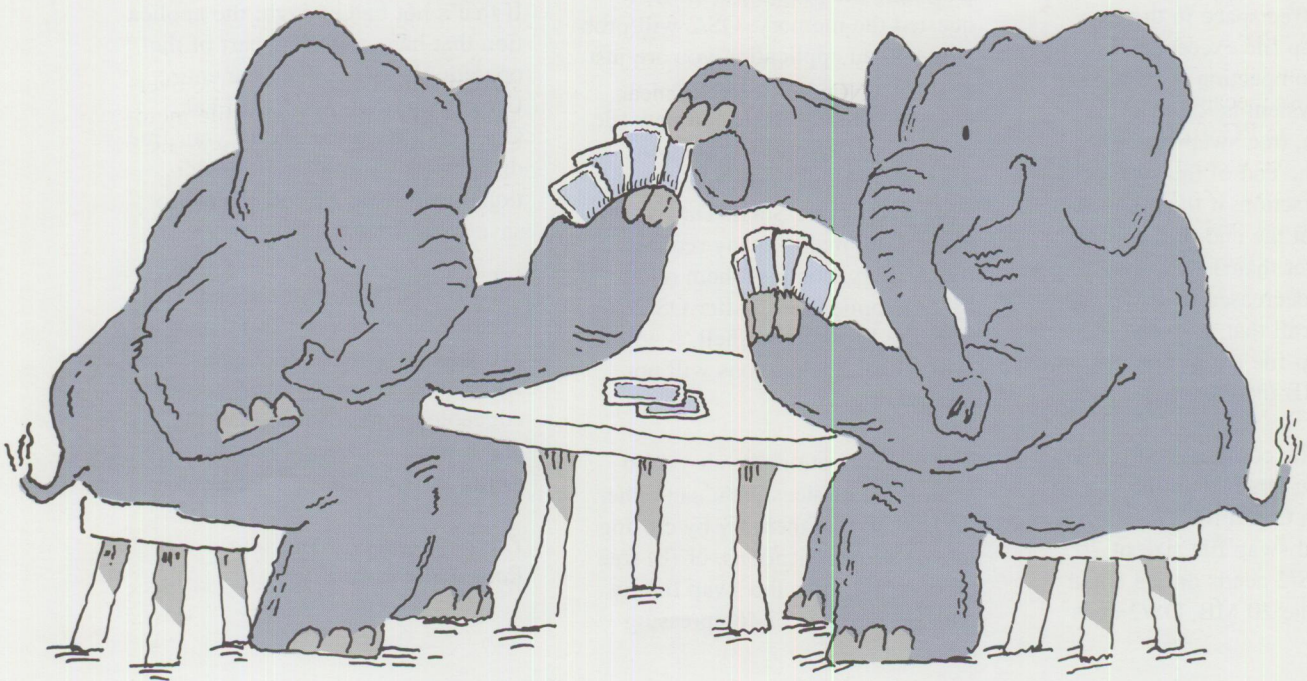
The swap file's contents include both code and data. The information stored there is either backed-up code and/or data in overcommitted systems, or some 16-bit OS/2 application code and resources. It is probably a combination of both.

The reason that 16-bit OS/2 application code and resources are backed up in the swap file is to improve performance by reducing the working set (the total amount of memory in use for programs and data). Segmented 16-bit applications require that an entire segment be brought into system memory, even if you need only a piece (page) of that segment. Perhaps that page was previously discarded (OS/2 uses an

aging algorithm to discard pages that have not lately been referenced, discarding the least-referenced page first). Whenever a reference is made to a discarded page, the complete 16-bit application segment containing that page is loaded into memory.

To minimize the impact on performance, when OS/2 2.1 (which is a 32-bit, flat-memory operating system that is managed in 4 KB pages) initially loads a 16-bit, segmented OS/2 application, OS/2 2.1 packs some segments into pages, and copies the packed pages to the swap file for faster recovery when needed.

The 16-bit application segments are packed based on five conditions. Packing must be enabled (which it is by default). Segments that are packed must be code segments only. They must be less than 32 KB in size, and the last page must contain fewer than 4000 bytes. There must also be at least three segments





to pack. This memory-packing algorithm makes the most effective use of memory and swap file space.

The packing feature can be disabled by using the NOPACK option in the MEMMAN= statement in CONFIG.SYS. NOPACK causes the swap file size to be smaller. However, the NOPACK option also brings about a decrease in performance, and a larger working set. The working set gets larger because, in OS/2 2.x, every 16-bit segment of any size up to 4096 bytes occupies a full 4 KB page in memory. This increase in the working set causes memory overcommitment to occur earlier. All told, it is always better to use the packing feature.

### Swap File Compaction

If the swap file must expand beyond its initial size, OS/2 has file management routines that compact the swap file back to its initial size as soon as possible.

The swap file shrinks when several conditions are met. When the amount of free space in the expanded swap file exceeds 1.5 MB, swap-file compaction is performed when the system is idle. During compaction, free swap space is moved to the end of the swap file. After compaction, if the amount of free space at the end of the swap file is greater than 1 MB, the swap-file size is decreased in 1 MB increments. (Recall that, as mentioned above, swap-file expansion also occurs in 1 MB increments.)

The swap file compacts only when it has grown larger than the size initially set in CONFIG.SYS. If you set an initial swap file size of 20 MB, but OS/2 needs only a small portion of the 20 MB, OS/2 does

not decrease the swap file to a smaller size.

### Reacting to the Minfree Warning

If you do not have COMMIT set, the minfree value determines when you get warning messages about low disk space. The same message appears every time the swap file expands and the remaining free disk space is less than the value specified in minfree.

Your options when the warning message appears are:

- (1) End Program/Command/Operation, or
- (2) Ignore the Error and Continue, or
- (3) Display Help

You can certainly ask to display help, but eventually you must take action.

If you choose option 1, OS/2 will terminate the program that requested the memory. OS/2 will probably end an application you are just starting, or an application that requested memory to open a new file or to access additional function. That application might even be the OS/2 Workplace Shell. The Workplace Shell makes many requests for memory, some of them on behalf of applications. After OS/2 ends the Workplace Shell, it will restart. Other applications will not restart.

The second option allows you to control the choices. You can either (a) free up real memory by closing one or two applications, or (b) free up disk space for the swap file by erasing, moving, or compressing other files.

In any case, *do not ignore the message*. Close any open applications, utilities, and folders to free up real memory. Look at the Window List to see what is currently active. You can close programs from the Window List by selecting them (they will be highlighted), displaying the pop-up menu (mouse button 2), and selecting Close. Alternately, you may want to use a file-packing utility to compress files to save space.

If you (unfortunately) choose to ignore the warning, here is what happens: A running application believes it has received the memory that it requested. OS/2, trying to accommodate that application, attempts to obtain the memory by expanding the swap file. However, there is not enough disk space to expand the swap file. The application, therefore, is denied access to its expected memory at a time when it cannot recover from the memory allocation failure. The upshot is that the application halts, and you may lose its data files.

If that's not bad enough: the application that halts might be part of the operating system. If so, the entire OS/2 operating system will halt. Once you reach the end of your free disk space, you will get no additional warnings, and no chance to save data.

Clearly, the best response to the minfree warning is to end the applications that you are no longer using. After all, you are the most knowledgeable source of information about what you need or do not need to run in your OS/2 environment.

*The biography for Virginia Roarabaugh is on page 32.*



## OS/2 Questions and Answers

Doug Azzarito  
IBM Corporation  
Boca Raton FL

### Q:

What is the EA\_DATA.\_SF file? It takes up a lot of space on my disk, and it seems to grow bigger all the time.

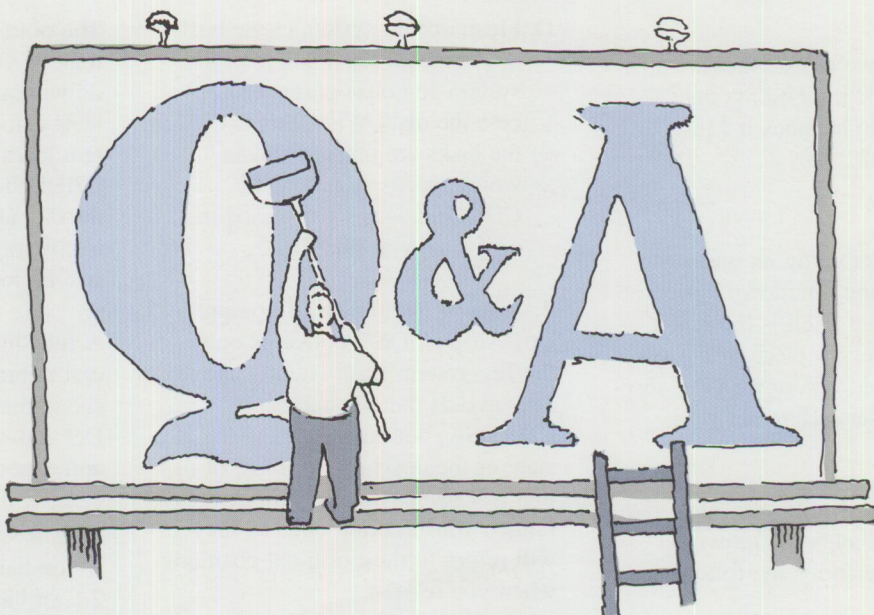
### A:

The EA\_DATA.\_SF file is where OS/2 stores Extended Attributes (EA) on FAT drives. (HPFS drives don't need this file, because HPFS has built-in EA storage facilities.) You must be very careful when handling EAs on FAT drives. Let's discuss the entire FAT EA picture.

Extended Attributes are an extension of the file attributes in DOS. The DOS file attributes are limited to HIDDEN, SYSTEM, READ-ONLY, and ARCHIVE. EAs are much more powerful. You can assign free-form text to any file (for example, the "title" of a file). You can also add an icon to the EA of a file.

When you add EAs to files on FAT drives, OS/2 stores the EAs in the EA\_DATA.\_SF file, and places a pointer to these EAs in the file's directory entry. The FAT directory entry includes 10 "reserved" bytes (currently unused by DOS). The EA pointer is stored in this area.

Here's the first problem: DOS destroys any data stored in the reserved area of a directory entry. So if you use DUAL BOOT, and allow DOS to update a file, any EAs on that file will be lost.



Each cluster (allocation unit) in EA\_DATA.\_SF corresponds to the EAs of one file. This is another problem: Usually, EAs for files occupy only a few bytes, and the rest of that cluster is wasted space. On a drive with 2048-byte clusters, 500 files with EAs will create a 1 MB EA\_DATA.\_SF file. Since HPFS has built-in EA storage, you won't waste as much space for EAs as with FAT.

Now that you see how and where EAs are stored, let's discuss the proper handling procedures for FAT files with EAs.

1. If you boot real DOS, then whenever DOS updates a file's directory entry by writing to that file, the link to the EA\_DATA.\_SF file is destroyed. OS/2's CHKDSK can reclaim the lost EAs, and EAUTIL can re-attach them, but it's better to avoid the problem.
2. If you use a DOS-based backup/restore program, all your EAs are lost, because no DOS pro-

gram saves and restores the EA pointers in the directory entries.

3. If you delete the EA\_DATA.\_SF file, you are left with pointers, but no data. This is the worst situation to be in, because if you ever add new EAs, they will be cross-linked with the old pointers. This often causes "access denied" errors, which can be corrected with OS/2's CHKDSK.

4. DOS CHKDSK doesn't know about EAs, so you should always use the OS/2 CHKDSK, even on FAT drives.

5. DIR /N shows you which files have EAs attached to them.

If you use care when booting real DOS, or if you stay in OS/2 at all times, the EA\_DATA.\_SF file won't cause any trouble. It may grow quite large, but only if you drop EAs into all your files. If you use that many EAs, you may want to switch to HPFS.



**Q:**

Why do I have to use Shutdown before I turn off my OS/2 system? What damage happens if I just power down?

**A:**

OS/2 has a lot going on under the covers, and the Shutdown option of the Workplace Shell is the safest way to stop every piece of the system. However, Shutdown isn't absolutely necessary. Here are your options:

1. Full shutdown. If you select the Workplace Shell's Shutdown option, OS/2 performs the following steps:

A. Inform All PM programs that they should shut down. PM programs can save any data, and even display a pop-up window to inform you that the program is shutting down.

B. Display a pop-up for each non-PM program. Since non-PM programs cannot be told that the system is shutting down, OS/2 wants you to give the go-ahead to stop these programs.

C. Save the current state of the desktop. This includes object positions, and the list of currently-running applications (so they can be re-started when you start OS/2 the next time).

D. Flush all file-system cache buffers, close all files, and lock the system so no programs can access the disk. When this is done, the disks are marked "clean," which means an automatic CHKDSK is not performed the next time you start OS/2.

2. "Quick" shutdown. If you press Ctrl-Alt-Del, OS/2 performs only the file-system flush (step D above). This avoids the automatic CHKDSK, but does not save the state of the desktop. For most of us, that just means that if you have rearranged your desktop objects, they will return to their original positions when you re-start.

3. "Dirty" shutdown. If you power off without using Shutdown or Ctrl-Alt-Del, nothing is saved. Since the file systems are not marked "clean," CHKDSK will run the next time you start OS/2. Also, because cache buffers were not flushed, some data may not have been written to disk, and is lost.

*If you press Ctrl-Alt-Del, OS/2 performs only the file-system flush.*

The potential for lost data is very real, so you should never power down your computer without at least using Ctrl-Alt-Del. If your system loses power accidentally, the CHKDSK recovery will minimize the damage to your files, but there is always a chance that critical data will be lost.

A full shutdown can often take several minutes. If you don't want to spend that much time, use Ctrl-Alt-Del and save yourself the trouble and expense of lost data.

**Got a Question?**

If you have questions about OS/2 2.1, or have a technical tip you would like to share with others, send me a note. I can be reached at:

CompuServe: 72360,3555  
Internet: azzarito@cse.fau.edu  
FIDO: 1:369/68

*Doug Azzarito is president of Technology Consultants of the Palm Beaches, Inc., a microcomputer consulting firm. He has worked on contract to IBM on OS/2 development projects since 1986. Doug is also co-author of RBBS-PC, the industry-standard bulletin board software for personal computers. He received a BS in Computer Science from the University of Florida in 1982.*



## IBM Personal Software Product Strategy

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IBM Corporation  
Boca Raton, Florida

*This is a reprint of part of the article in the April 1993 issue of IBM Personal Systems Technical Solutions.*

### Requirements for Future Directions

Today's users are making tradeoffs when determining the appropriate operating system and platform to develop and run the software that solves their business problems. DOS and OS/2 are Intel-based, while UNIX\*\* is often RISC-based. Advanced, Intel-based, 32-bit appli-

cations are available on OS/2. Even if they could run on the same platform, user interfaces are so dissimilar that end-user education and productivity, as well as end-user support, can be adversely impacted.

Today, users are compromising with an inferior application, or they "swallow" the expense of multiple systems on the same desktop. Could there be a way to run existing UNIX applications on Intel processors, and existing DOS, DOS/Windows, and OS/2 applications on RISC processors? Currently, a vast amount of processing power on desktops is mostly unused. Could we start using those idle MIPS? Is there a way to ensure that applications written today will still be of value as technology changes? Additionally, can we build and maintain a library of code (objects) that could be used and reused by OS/2, UNIX, and application developers? Could it be possible to make DOS, OS/2, and UNIX look and feel the

same, using the most advanced user interface in the industry?

### Introducing the Workplace Family

To satisfy these requirements and more, IBM is introducing the Workplace family. As shown in Figure 1, the Workplace family includes some current offerings and a new platform, the Workplace Operating System (OS). We are designing the Workplace family to do the following:

- Improve usability for users, LAN administrators, and application developers
- Help protect customer investment in hardware and software
- Address business requirements ranging from stand-alone users to connected enterprises
- Increase productivity for users, LAN administrators, and application developers

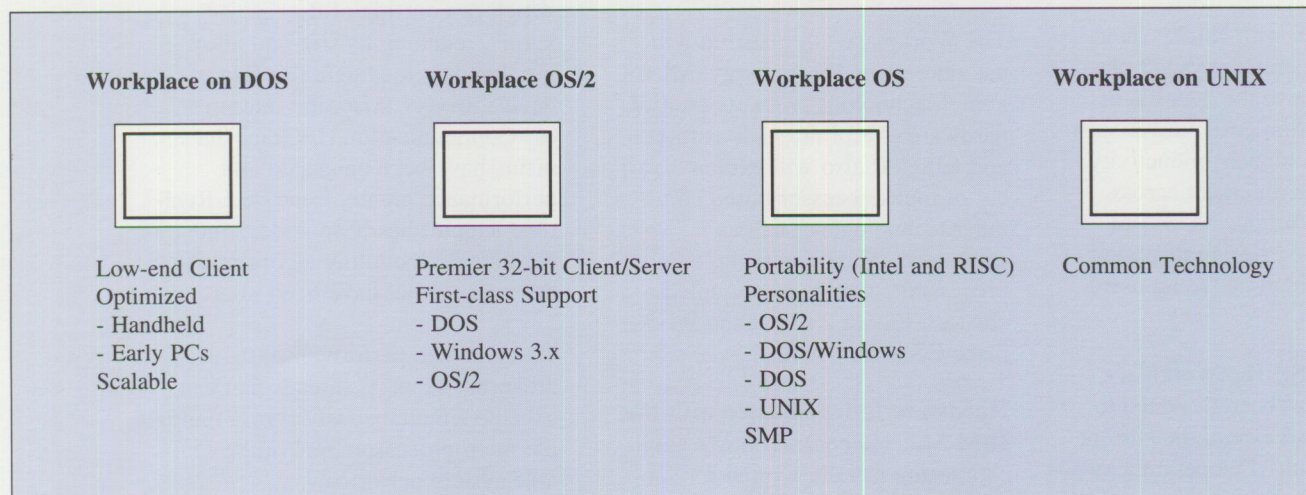


Figure 1. IBM's Workplace Family



We plan to continue enhancing OS/2 and AIX\*, building on their unique strengths and attributes, while taking advantage of similar architectural components. The architectural components that members of the Workplace family will share are the Workplace Shell, objects, and distributed computing. While using this technology across product lines, we plan to make it available to other software and hardware companies.

**Workplace Shell:** Improved usability is key to personal computing in the 1990s. Based on user feedback, IBM will be using the Workplace Shell across its product line. We are working toward developing a powerful, easy-to-use interface for DOS that complements the new generation of portables - Workplace on DOS. This will improve the usability of DOS by eliminating complex syntax and command strings. It will provide a GUI consistent with OS/2, simplifying the use of DOS and migration to OS/2. Workplace OS/2 will continue to be enhanced to make it an even more powerful, yet easy-to-use interface. The Workplace Shell GUI is also being developed for the UNIX environment.

Providing users with similar interfaces across operating system platforms can achieve the benefits of reduced education costs, lower support costs, and higher productivity. A common user interface across DOS, OS/2, Workplace OS, and UNIX is the first step in resolving the platform dilemma facing users today.

**Workplace OS:** The Workplace OS platform has been designed to complement and extend the current OS/2, DOS, and AIX operating system family. Workplace OS is a flexible, modular platform that allows

"pluggable" support for device drivers, application environments, and operating system services (from advanced file systems and communications systems to multimedia, pen, and speech systems).

With the Workplace OS platform, users will be able to take advantage of multiple operating system environments called *personalities* on a single desktop. A personality takes on the characteristics and support of an operating system platform, such as OS/2 or DOS. Personalities can include DOS, Windows, OS/2, and UNIX. The UNIX personality is being designed to support different UNIX application environments. Initially, the UNIX personality is planned to be based on OSF/1\*\* 1.2 Application Environment Specification (AES), and will support existing AIX PS/2 Version 1.3 applications. Other UNIX environments under consideration are AIX for the RISC System/6000\* and SVR4.X.

The Workplace OS platform will take advantage of the common technology (Workplace Shell, objects, application frameworks, and distributed computing) that will be utilized across the IBM PSP family.

The Workplace OS platform will use microkernel technology. Microkernel technology supports multiple hardware platforms, such as Intel and RISC. It also will exploit a variety of multiprocessor-based computer technologies, such as symmetric multiprocessing, parallel processing, and loosely coupled clusters. Figure 2 shows the Workplace OS architecture.

**Hardware Independence with the IBM Microkernel:** Today's applications are usually written for specific operating systems. This has created a problem for both MIS

staff and developers. They must select the platforms and then write the application for each system's native operating system. To resolve the problem of developing multiple versions of the same application, IBM is developing the IBM microkernel with operating system personalities.

IBM's approach takes a single microkernel and makes it run on many processor types - whether Intel or RISC - such as IBM's PowerPC\* RISC processor under development by IBM, Apple\*\*, and Motorola\*\*. However, instead of developing an IBM proprietary microkernel technology, we chose to work from an industry-standard kernel. Our microkernel architecture is based on Carnegie-Mellon\*\* University's Mach 3 microkernel. Developing from an industry-standard kernel allows IBM to offer this kernel to other hardware and software companies in the industry, underscoring IBM's strong commitment to open systems and industry standards.

IBM has extended the Mach microkernel to provide additional capabilities and enhanced performance. Among the enhancements is the ability to have user-level device drivers which run outside of the microkernel, reducing its size and allowing dynamic loading/unloading of device drivers. Also, the Interprocess Communication (IPC) mechanisms have been enhanced and performance greatly improved. Real-time support has been added, and the thread-scheduling algorithms in the microkernel have been improved.

To maximize performance, the microkernel supports threads that can execute simultaneously across multiple microprocessors, providing scalable system performance.



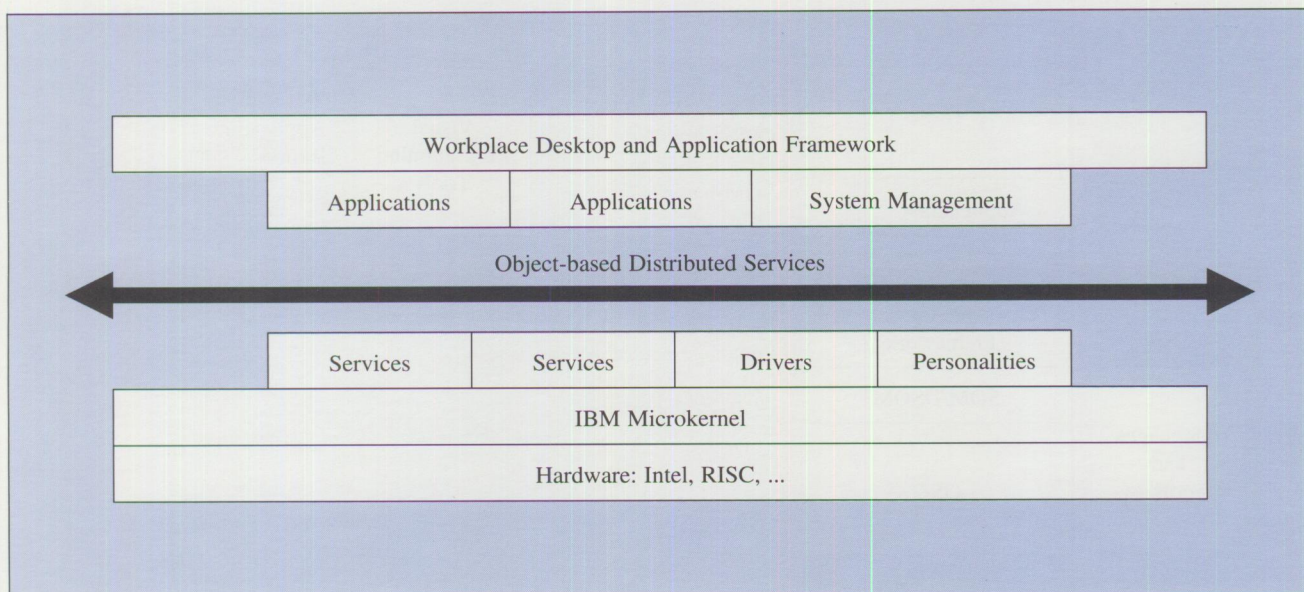


Figure 2. Workplace OS Architecture

### Support for Multiple Processors:

Microkernel symmetrical multiprocessing support enables applications to run different threads of execution simultaneously on different microprocessors within the same system. Users can scale the performance of the system as application and system workload demands increase. When the symmetrical multiprocessing microkernel is used in combination with our distributed computing environment, a system's workload can be allocated efficiently across multiple systems in a single network, delivering substantially better performance.

### Support for Wide Range of

**Applications:** To ensure that existing and new applications will continue to run, we are building personalities that work with the microkernel. The microkernel contains the microprocessor-specific code (containing only the code that controls fundamental CPU access and processes), but the personalities provide the application environment. Therefore, DOS, Windows, OS/2,

and UNIX applications run unmodified within their specific personality on the microkernel. The result is an optimized microkernel and personality that can accomplish more, and with greater flexibility and reliability than a monolithic operating system.

### Object-Oriented Technology

IBM PSP is developing object-oriented technologies with a distributed system and application focus, pursuing a strategy to significantly improve the next generation of computing. Our focus is on creating an open environment for developing distributed applications.

**End User's View:** From the user's perspective, object-oriented technology will make using personal computers more intuitive and easier to use. For example, in OS/2's Workplace Shell, a user can simply "drag and drop" the picture of a file onto a picture of a printer to get a document printed. The user does not have to remember complex operating system instructions. Object-

oriented technology will bring several benefits to users:

- Increased ease of use and productivity that includes more intuitive applications and consistent interaction among applications
- Greater application availability, since applications can be developed faster because of reusable code
- Higher-quality application reliability due to reusable code

### Application Developer's View:

Object-oriented programming has established itself as an important methodology in developing high-quality, reusable code. Operating systems and tools vendors are beginning to offer class libraries and frameworks. Visual programming tools are emerging to assist end users with software application assembly.

Our strategy is to develop products that provide a basis of developing object-oriented distributed applications, and enable domain experts



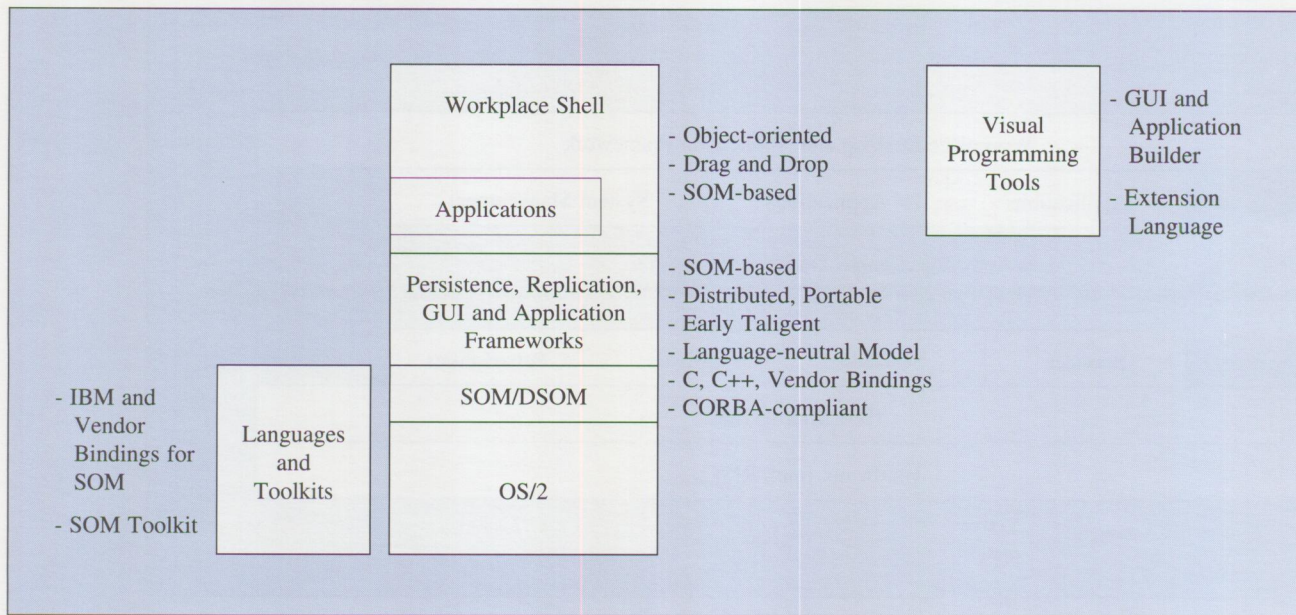


Figure 3. Object Enabling and Visual Programming Tools

and end users to create distributed line-of-business applications.

The paths to achieve this strategy are the development of system-level enabling technologies and frameworks, and creating application development shells and protocols. At

the system level, efforts are focused on the SOM. At the applications development level, a set of applications frameworks and visual programming tools are under development, as shown in Figure 3.

**System Object Model:** In OS/2 2.0, IBM introduced a new system for developing class libraries and object-oriented programs. This system is called *System Object Model*. SOM is a technology for packaging object-oriented class libraries. It provides a language-neutral model for

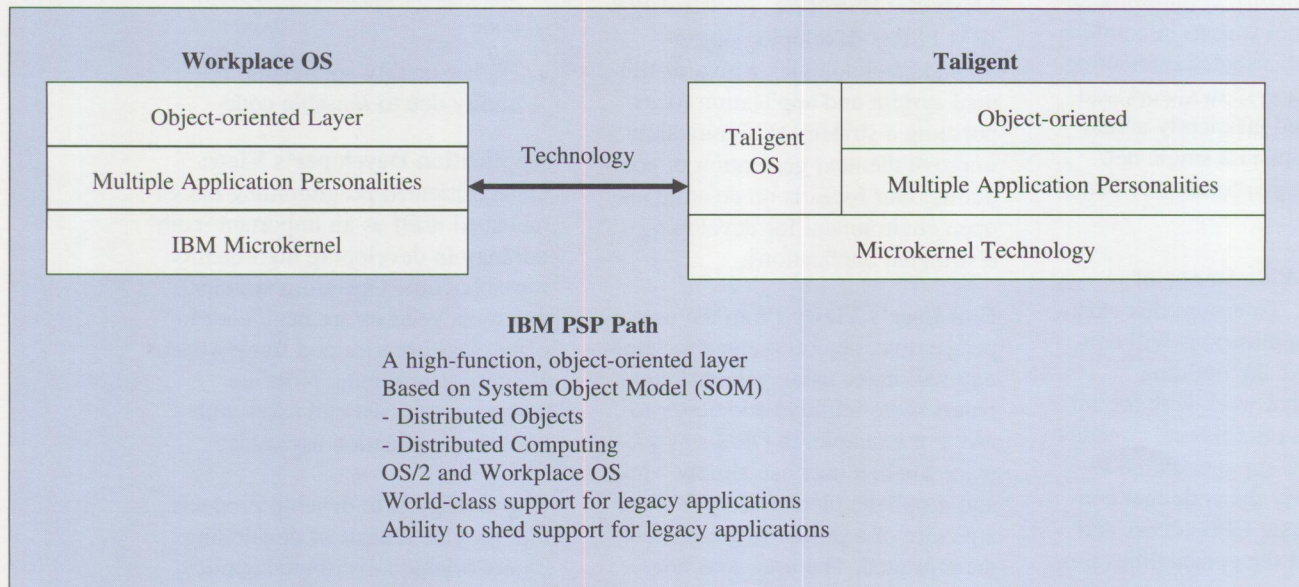


Figure 4. IBM's Object-oriented Direction



defining libraries of objects that operate across many computer languages. Because a single version of an application will operate on many computer systems, software developers should be able to spend their time building new applications. They should no longer waste time building multiple versions of each application for every supported computing platform. Class libraries built with SOM can be defined and implemented in one language and be usable in another language. Today's SOM supports the C language. Additional language support, including C++ and COBOL, will become available in 1993 and 1994.

Because this approach allows developers to build applications by tailoring and linking pretested objects from different developers' libraries, two fundamental changes can occur in software development. First, software developers become more productive; they can create sophisticated applications in a fraction of the time of traditional programming methods. Second, the work invested in creating an object has multiple dividends, since the object is reused in future applications.

IBM's SOM is a clean-sheet approach to unlocking the benefits of the object-oriented systems model. It is not dependent on any specific computer language, architecture, CPU, or operating system. SOM is currently shipped as part of OS/2 (runtimes with the operating system, and bindings and SOM compiler in the OS/2 Developer's Toolkit); it has been a funded development effort at IBM since 1989. Since then it has been reviewed by some of the computer industry's leading developers of programming languages, and by commercial and corporate software developers. These reviewers anticipate SOM's role as a universal

translator of applications and objects developed in diverse programming languages.

**Taligent:** Taligent\*\* is an independent joint venture established by IBM and Apple. A key objective in forming Taligent was to bring the benefits of object-oriented technology to customers more quickly. Taligent's native environment will coexist with IBM's current products. Integrating Taligent-derived technology into IBM's Workplace family will provide a stable path to Taligent's new generation of systems.

Taligent will play an important part in optimizing the 32-bit object environment by introducing revolutionary object technologies. As shown in Figure 4, IBM PSP will integrate technology from Taligent in future versions of IBM's products. Eventually, Taligent will introduce an

object-oriented environment, re-engineered from the ground up, and will build compatibility around it for today's 32-bit OS/2 applications.

*DeeAnne Safford is a program manager in IBM's Personal Software Products Marketing Strategy Group. She is presently involved with developing the marketing strategies for Personal Software Products. She holds an MBA from Nova University in Fort Lauderdale, Florida.*

IBM Personal Systems Technical Solutions, published bimonthly, features technical articles about hardware, software, and networking. Subscriptions are available for \$50 a year from The TDA Group, P. O. Box 1360, Los Altos CA 94023-1360. IBM employees can subscribe by using the subscription facility in INEWS.





## Report on IBM's PSP User Group Relations

Gene Barlow  
IBM Corporation  
Austin, Texas


Now in its second decade, IBM's PSP User Group Relations is doing more than ever to support PC user groups.

IBM was among the first companies to recognize the valued role that PC user groups play in the microcomputer industry. IBM's PC User Group Support department was among the first ten departments set up by the fledgling IBM Personal Computer business in 1981. During the 1980s, our user group support programs were unparalleled and became the model for other PC hardware and software vendors to emulate. IBM's high level of support and concern for PC user groups continues today.

At the local user group level, we locate and furnish knowledgeable speakers to present at monthly meetings. To complement speakers, we furnish door prizes and merchandising items. Occasionally we place ads in user group publications. We list all the local user groups that are known to us in our comprehensive data base, and we help people find their nearest PC user group. We pro-

duce this publication, *IBM Personal Software Technical Newsletter*, specifically for PC user groups, and in future issues we intend to reprint the best articles about IBM Personal Software Products that first appeared in local user group newsletters.

We will be enhancing our support for OS/2-specific user groups, and for OS/2 Special Interest Groups (SIGs) within PC user groups. Stay tuned!



*We will be enhancing our support for OS/2-specific user groups and for OS/2 Special Interest Groups within PC user groups.*

For many years we have cultivated good relationships with PC user group officers. We contact them periodically to solicit their feedback. We send them samples of PC software products that we acquire. User group officers get toll-free access to the IBM National Support Center BBS. When time permits, we send them PC User Group Officer Notes, which keeps them abreast of things that officers should know.

IBM was instrumental in the formation of the Association of PC User Groups, and we continue to promote the association and its activities. Our most visible contribution is the sponsorship of several events, usually spanning an entire weekend, that take place under APCUG auspices at major trade shows. We supplied IBM PC computer systems and software for the APCUG's Globalnet BBS, a state-of-the-art system employing the latest technologies and literally spanning the globe. We are in constant contact with the APCUG's officers – the world's leading PC user group advocates – and we sponsor some of their activities, such as informal meetings, the development of the APCUG's user group data base, and the APCUG's demographic survey of user group members.

While doing all these things for the PC user group community, IBM has also developed cordial relationships with our fellow user group relations staffs from other major vendors. All of us want to ensure that PC user groups receive the attention and recognition they deserve.

We welcome any feedback you have about our support programs. Please send it to

IBM PSP User Group Relations  
P.O. Box 201449  
Austin TX 78720-1449

or electronically via Internet to  
[ibmpcug@vnet.ibm.com](mailto:ibmpcug@vnet.ibm.com).  
Thanks!



# OS/2 User Group Listing

Over the past year dozens of OS/2 User Groups have been formed. Joining a user group is a great way to share information and broaden your knowledge about OS/2. This list will assist you in contacting a group near you.

The designation "OS/2 SIG" indicates a Special Interest Group within a larger PC User Group.

<b>Arizona</b>  Phoenix PC Users' Group, OS/2 SIG c/o Bill & Ester Schindler P.O. Box 355637 Phoenix, AZ 85069  Tucson Computer Society, OS/2 SIG c/o John Aucott P.O. Box 1489 Tucson, AZ 85702  OS/2 User Group for Northern Arizona c/o Keith Wood 1448 E Maricopa Cottonwood, AZ 86326	Fresno PC Users Group, OS/2 SIG P.O. Box 5987 Fresno, CA 93755  Bay Area OS/2 User Group c/o Guy Scharf, Software Architects Inc 2163 Jardin Dr Mountain View, CA 94040-2253  San Francisco OS/2 Users Group c/o Bob Barber, AOSI 250 World Trade San Francisco, CA 94111  San Francisco PC Users Group, OS/2 SIG 3145 Geary Blvd #284 San Francisco, CA 94118	<b>Florida</b>  Space Coast PC Users Group, OS/2 SIG P.O. Box 369 Cocoa, FL 32923-0369  South Florida OS/2 User's Group c/o Doug Azzarito 2399 NW 30th Rd Boca Raton, FL 33431-6212  Tampa Bay OS/2 Users Group c/o Sue Mattiace, IBM Corporation 3109 W Dr ML King Jr Blvd Tampa, FL 33607  Pinellas IBM-PC Users Group, OS/2 SIG c/o Michael C Grogg 1510 Barry St, #J-2 Clearwater, FL 34616-4410
<b>California</b>  Greater South Bay PCUG, OS/2 SIG c/o Fred Zimble 355 S Grand Ave, 22nd floor Los Angeles, CA 90071  Long Beach IBM Users Group, OS/2 SIG 4176 Woodruff Ave, Suite 517 Long Beach, CA 90713  Los Angeles OS/2 Technical Architect Group c/o Alan Duboff 6507 Whitaker Ave Van Nuys, CA 91406	OS/2 User Group, c/o Gerald Brown, World Savings and Loan 794 Davis St San Leandro, CA 94577  Sacramento PCUG, OS/2 SIG c/o TR Rudkin 7228 Circle Park Way Sacramento, CA 95823	<b>Georgia</b>  Atlanta OS/2 Users Group c/o Robert Cannon, Micro Integration Services 3070 Presidential Dr, Suite 220 Atlanta, GA 30340
San Diego OS/2 User Group c/o Craig Swanson P.O. Box 13346 La Jolla, CA 92039-3346  Orange County IBM PCUG, OS/2 SIG P.O. Box 1779 Brea, CA 92622  North Orange County Computer Club, OS/2 SIG P.O. Box 3616 Orange, CA 92665	Sacramento OS/2 Users Group c/o Charlie Kotan P.O. Box 460 Grass Valley, CA 95945  <b>Colorado</b>  Rocky Mountain OS/2 User Group c/o Robert Saenz, IBM Corporation 4700 S Syracuse Denver, CO 80237	<b>Illinois</b>  North Suburban Chicago OS/2 User Group c/o James Schmidt, William M Mercer Inc 1417 Lake Cook Rd Deerfield, IL 60015  Western Suburban OS/2 User Group c/o Dwight Cannon, CR Industries 888 N State St Elgin, IL 60123
Los Angeles OS/2 User Group c/o Paul Duncanson 3008 Texas Ave Simi Valley, CA 93063	<b>Connecticut</b>  New England OS/2 User Group c/o Ron Beauchemin ABB C-E Services Inc 200 Great Pond Dr Windsor, CT 06095  Danbury Area Computer Society, OS/2 SIG 12 Noteworthy Dr Danbury, CT 06810-7217	Chicago Computer Society, OS/2 SIG c/o Raymond Prior, Reuters 311 South Wacker, Suite 1200 Chicago, IL 60606  Chicago OS/2 User Group c/o Elwood Spencer, IBM Corporation One IBM Plaza (7th flr) Chicago, IL 60611



<b>Illinois (cont.)</b> Champagne-Urbana OS/2 Users Group c/o Melissa Woo Dept Physio & Biophysics 524 Burrill Hall 407 S Goodwin Ave Urbana, IL 61801 Central Illinois OS/2 Users Group c/o Britt Hagen, IHCCCC 516 E Monroe, Suite 200 Springfield, IL 62701-1529	<b>Michigan</b> Users' PC Organization, OS/2 SIG P.O. Box 80086 Lansing, MI 48908-0086 Delta DOS User's Group, OS/2 SIG c/o Dr John G Faughnan College of Human Medicine 2500 Seventh Ave South #120 Escanaba, MI 49829-1196	Central Jersey PCUG, OS/2 SIG c/o Peter Cohen 306 Ryan Ave Bayville, NJ 08721
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OS/2 Working Group G.U.I.D.E. Karel Van der Haegen, K.U. Leuven - D.T.E.W. Dekenstraat, 2 Leuven, B-3000 Belgium
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Singapore OS/2 User Group c/o Yap Keng Ann, IBM Singapore 80 Anson Rd 0207 Singapore



*Joining a user group is a  
great way to share  
information and broaden  
your knowledge.*



## TEAM OS/2 Wants You!

*Vicci Conway  
IBM Corporation  
Boca Raton, Florida*

*and Janet Gobeille  
IBM Corporation  
Somers, New York*

TEAM OS/2 consists of volunteers who are OS/2 enthusiasts and who actively share their OS/2 knowledge and enthusiasm with others. Their activities include:

- Supporting OS/2 user groups
- Running private OS/2 BBSs or serving as a SysOp on major public BBSs or e-mail systems
- Demonstrating OS/2 to user groups, at retail stores, and in other public places
- Encouraging others to install and use OS/2
- Helping support those who use OS/2 already by answering questions

and many other activities fostered by the unlimited imagination of teamers!

### Joining the Team

Teamers include IBM employees and non-IBMers world-wide. Membership in TEAM OS/2 is not limited to IBM employees; we encourage everyone who wants to promote OS/2 to join the team.

To join TEAM OS/2, contact one of the following:

CompuServe\*\*: Vicci Conway,  
76711,1123

Fidonet: Janet Gobeille,  
1:109/347.3479

IBMMAIL: Vicci Conway,  
USIB4V94 at IBMMAIL

Internet: Vicci Conway,  
vicci@vnet.ibm.com

or fax your information to Vicci Conway at 1-407-982-1229.

Please include:

- Your name
- Your userid(s) on all BBSs and e-mail systems that you frequent

(this will be published in our public TEAM OS/2 list)

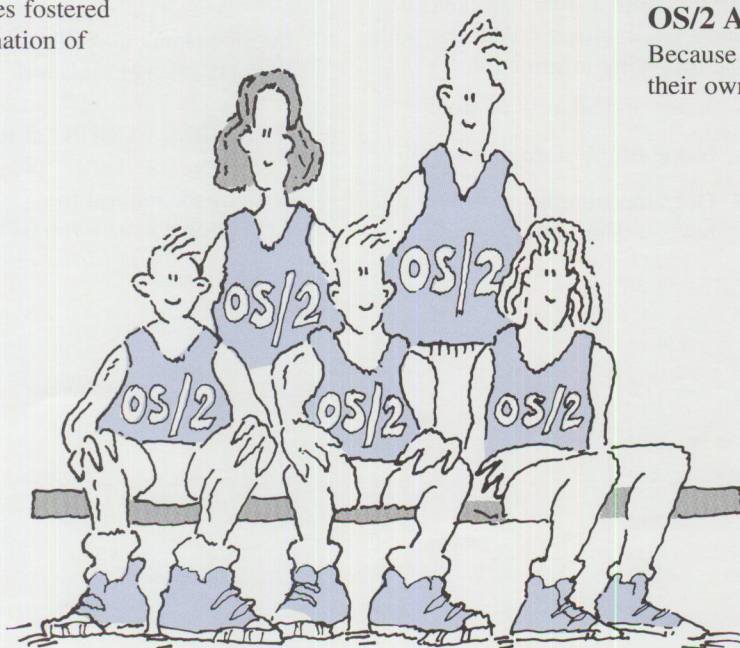
- Mailing address (will not be published)
- City, state, zip (this will be published)
- Phone number (will not be published)
- A one-line description about your participation (this will be published). For example, you may run an OS/2 BBS, be a member of (or have founded) a user group, be an OS/2 software consultant, or be the author of an OS/2 application.

Also, please let us know what you've been doing to qualify for TEAM OS/2. Refer to the list of activities mentioned above, or come up with something new and different!

We will then put your name, city and state, BBS and e-mail addresses (of whichever systems you mention), and description in our public TEAM OS/2 list.

### IBM Support of TEAM OS/2 Activities

Because TEAM OS/2 members use their own time, and often their own





funds, to do public OS/2 demos and to support and encourage local retailers, IBM is offering support for these activities.

**Demos:** If you're planning to demonstrate OS/2 for a group of people or a public event – for example, public demos at universities, PC fairs, hamfests, shopping center malls, and OS/2 days at local retailers – please contact us (see how at the end of this section). We would like to know:

- Date and location of scheduled event (location, city, state, country)
- Number of teamers involved in doing or supporting the demo
- Number of people expected to see your demo
- If this is a public demo at a software retail store, also tell us how many store personnel are expected to be working at the store during your demo (so that we can send them all OS/2 T-shirts to wear during your demo!)
- Your name, shipping address, and telephone number

We would like to help with a TEAM OS/2 Demo Pack, which consists of things to support your demo and to give away during it. The specific contents of your Demo Pack will vary according to your event, and we will discuss the contents after receiving your request.

After your event, please send us a report that includes:

- Names and addresses of all the teamers involved in the activity
- The number of people who saw your demo or tried OS/2 during that time
- Your assessment of how it went. Tell us what went well, what didn't, and any advice you have for others doing demos.
- Your suggestions for our TEAM OS/2 support in the future

*Note:* This demo support does not apply to user group presentations. For support of a demonstration to a user group, contact:

Internet: [ibmpcug@vnet.ibm.com](mailto:ibmpcug@vnet.ibm.com)

Inside IBM:  
IBMPCUG at AUSVM1

**Adopt a Store:** We encourage you to "adopt" a local retail store. Meet the employees, answer their questions about OS/2, encourage them to stock it, and visit them on a regular basis.

If you adopt a store that plans to carry OS/2, please contact us with the following information:

- Name and address of store
- Name of the store manager
- Does the store have, or will it have, a demo OS/2 system?

- Does the store need some OS/2 marketing materials (posters, literature, and so on)?

If the answer to the last question is yes, we'll send you a TEAM OS/2 Store Pack for you to give to them. It contains things for the store's employees, marketing literature, posters, OS/2 2.1 demo diskettes, etc.

*Note:* Retail store support is currently available only within the U.S. However, if teamers outside the U.S. want to develop local versions of these Store Packs, please send an e-mail note or a fax to LUVOS2 (see below). We will then send you more information.

**Contact Information for TEAM OS/2 Support from IBM:** Please send your support request or inquiry to:

CompuServe: Vicci Conway,  
76711,1123

Fidonet: Janet Gobeille,  
1:109/347.3479

IBMMAIL: Janet Gobeille,  
USIB45RN at IBMMAIL

Internet: Janet Gobeille,  
[LUVOS2@vnet.ibm.com](mailto:LUVOS2@vnet.ibm.com)

Inside IBM: LUVOS2 at RHQVM12

or fax your request to  
LUVOS2 at 1-914-766-3784.



## Editorial: A New Name for an Old Friend

Welcome to the first issue of *IBM Personal Software Technical Newsletter*.

Does it look familiar? We hope it does. It's the look we started in 1985 when we began publishing *Exchange* magazine and sending it to PC user groups throughout the U.S. Then, in 1988, we used the same look to start up *IBM Personal Systems* magazine, which today is going strong in its sixth year of publication.

If you belonged to a PC user group in the mid 1980s, you probably remember *Exchange*. In it, we tried hard to provide you with useful technical information of added value, written both by IBM employees and by user group members. *Exchange* was very popular, and it was the linchpin in IBM's industry-leading PC user group support.

Now that we are poised to provide new heights of user group support in the 1990s, we think it's time to bring you a newsletter similar to *Exchange*. We're going to concentrate on bringing you technical information about IBM's state-of-the-art Personal Software Products – OS/2, DOS, LAN Systems, Multimedia, Object Technology, Pen/Speech, and Taligent – and that's why we've named this newsletter *IBM Personal Software*.

This first issue consists primarily of articles from IBM employees about OS/2 2.1 and the Personal Software Products strategy. In future issues, we want to give lots of space to articles written by user group members. As in our previous practice, we encourage user group members to write articles for their own user group newsletters, after which we'll read the newsletters, find the best articles about IBM Personal Software Products, and reprint them (with authors' permission) in *IBM Personal Software Technical Newsletter*. So please make sure we receive your group's newsletter! Our address is on the inside front cover.

Even though we're not new at producing publications like this one, we still want to get your feedback. We've set up a userid on Internet (which is also inside the front cover) to make it easy for you to communicate with us. We hope to hear from you, and we hope you enjoy *IBM Personal Software Technical Newsletter*!

Gene Barlow  
Program Manager  
IBM PSP User Group Relations



“ OS/2 2.1 provides a better environment for Windows than native Windows 3.1. (page 2)

“ OS/2 2.1 can now be installed from CD-ROM. (page 8)

“ An easy way to customize the Workplace Shell is to use associations. (page 25)

“ If the name of a .DLL file starts with BVH or IBM, it must remain in the \OS2\DLL subdirectory on the requester machine. (page 31)

“ The Migrate Utility locates program files, creates program icons, and sets paths and some specific settings. (page 33)

“ The swap file's minfree value acts as a warning buffer. (page 36)

“ If you press Ctrl-Alt-Del, OS/2 performs only the file-system flush. (page 40)

“ IBM's approach takes a single microkernel and makes it run on many processor types. (page 42)

“ Joining a user group is a great way to share information and broaden your knowledge about OS/2. (page 47)

“ TEAM OS/2 consists of volunteers who are OS/2 enthusiasts. (page 51)